SHARP SERVICE MANUAL

S9409R995JPJ/

CONVECTION
MICROWAVE OVEN

MODEL R-995J

In interests of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

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SHARP CORPORATION

SERVICE MANUAL

SHARP

CONVECTION
MICROWAVE OVEN

R-995J

GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

CAUTION
MICROWAVE RADIATION

DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

Service engineers should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured. Never operate the device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

WARNING

Never operate the oven until the following points are ensured.
(A) The door is tightly closed.
(B) The door brackets and hinges are not defective.
(C) The door packing is not damaged.
(D) The door is not deformed or warped.
(E) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

All the parts marked "*" on parts list are used at voltages more than 250V.

Removal of the outer wrap gives access to potentials above 250V.

All the parts marked "Δ" on parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

SHARP CORPORATION

OSAKA, JAPAN

PRODUCT SPECIFICATIONS
APPEARANCE VIEW
OPERATING SEQUENCE
FUNCTION OF IMPORTANT COMPONENTS
SERVICING AND TROUBLESHOOTING CHART
TEST PROCEDURE
TOUCH CONTROL PANEL ASSEMBLY
COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE
MICROWAVE MEASUREMENT
WIRING DIAGRAM
PARTS LIST

PRODUCT SPECIFICATIONS

ITEM	DESCRIPTION
Power Requirements	230 - 240 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	1600 W (Microwave) 1600 W (Convection)
Power Output	900 watts (IEC Test Procedure) Operating frequency of 2450MHz
Convection heater	1500 W
Case Dimensions	Width 627mm Height 381mm Depth 528mm
Cooking Cavity Dimensions	Width 410mm Height 246mm Depth 410mm
Control Complement	Touch Control System Clock (1:00 - 12:59) Timer (0 - 99 min. 99 sec.) Microwave Power for Variable Cooking Repetition Rate; HIGH ..... Full power throughout the cooking time MED HIGH ..... approx. 70% of Full Power MED ..... approx. 50% of Full Power MED LOW (DEFROST) ..... approx. 30% of Full Power LOW ..... approx. 10% of Full Power Convection Temperature for Variable Cooking CONVECTION ..... 40 to 250˚C Temp. control LOW MIX(BAKE) ..... 180˚C with 10% of microwave power HIGH MIX(ROAST) ..... 200˚C with 30% of microwave power GRILL ..... 250˚C (Preheat)) HELP pad INTELLIGENT SENSOR pad REHEAT SENSOR pad DEFROST SENSOR pad WEIGHT ADJUST pad SENSOR INSTANT ACTION pads MORE, LESS pads CONVECTION COOKING FUNCTION pads POWER LEVEL pad MEMORY pad NUMBER and TEMPERATURE pads STOP/CLEAR pad, CLOCK pad INSTANT COOK/START pad
Set Weight	Approx. 31 kg

GENERAL INFORMATION

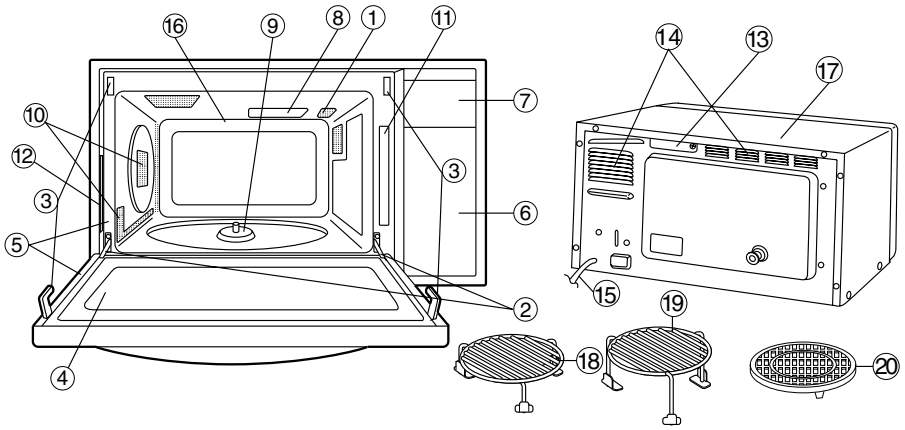
WARNING
THIS APPLIANCE MUST BE EARTHED

IMPORTANT
THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

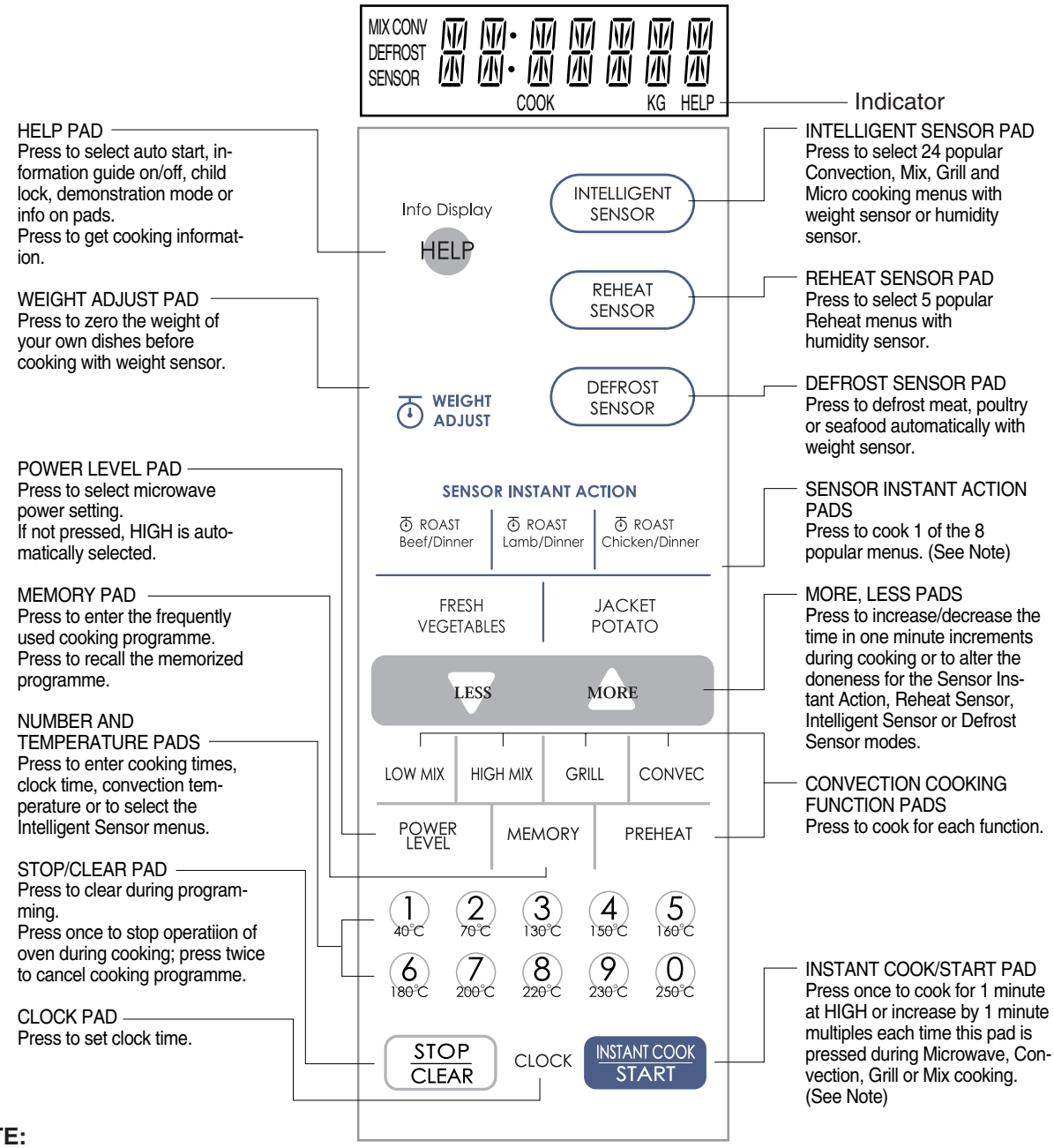
GREEN-AND-YELLOW	: EARTH
BLUE	: NEUTRAL
BROWN	: LIVE

APPEARANCE VIEW

1. Oven lamp
2. Door hinges
3. Door safety latches
4. See through door
5. Door seals and sealing surfaces
6. Touch control panel
7. Digital readout
8. Waveguide cover
9. Turntable motor shaft
10. Convection air openings
11. Menu label for Intelligent sensor
12. Rating label
13. Access cover for oven lamp replacement
14. Ventilation openings
15. Power supply cord
16. Oven cavity
17. Outer cabinet
18. Low rack
19. High rack
20. Defrost rack



TOUCH CONTROL PANEL


MIX CONV
DEFROST
SENSOR
COOK
KG
HELP
Indicator
HELP PAD
Press to select auto start, information guide on/off, child lock, demonstration mode or info on pads.
Press to get cooking information.
WEIGHT ADJUST PAD
Press to zero the weight of your own dishes before cooking with weight sensor.
POWER LEVEL PAD
Press to select microwave power setting.
If not pressed, HIGH is automatically selected.
MEMORY PAD
Press to enter the frequently used cooking programme.
Press to recall the memorized programme.
NUMBER AND TEMPERATURE PADS
Press to enter cooking times, clock time, convection temperature or to select the Intelligent Sensor menus.
STOP/CLEAR PAD
Press to clear during programming.
Press once to stop operatiion of oven during cooking; press twice to cancel cooking programme.
CLOCK PAD
Press to set clock time.
Info Display
HELP
WEIGHT ADJUST
INTELLIGENT SENSOR
REHEAT SENSOR
DEFROST SENSOR
SENSOR INSTANT ACTION
ROAST Beef/Dinner
ROAST Lamb/Dinner
ROAST Chicken/Dinner
FRESH VEGETABLES
JACKET POTATO
LESS
MORE
LOW MIX
HIGH MIX
GRILL
CONVEC
POWER LEVEL
MEMORY
PREHEAT
1 40°C
2 70°C
3 130°C
4 150°C
5 160°C
6 180°C
7 200°C
8 220°C
9 230°C
0 250°C
STOP CLEAR
CLOCK
INSTANT COOK START
INTELLIGENT SENSOR PAD
Press to select 24 popular Convection, Mix, Grill and Micro cooking menus with weight sensor or humidity sensor.
REHEAT SENSOR PAD
Press to select 5 popular Reheat menus with humidity sensor.
DEFROST SENSOR PAD
Press to defrost meat, poultry or seafood automatically with weight sensor.
SENSOR INSTANT ACTION PADS
Press to cook 1 of the 8 popular menus. (See Note)
MORE, LESS PADS
Press to increase/decrease the time in one minute increments during cooking or to alter the doneness for the Sensor Instant Action, Reheat Sensor, Intelligent Sensor or Defrost Sensor modes.
CONVECTION COOKING FUNCTION PADS
Press to cook for each function.
INSTANT COOK/START PAD
Press once to cook for 1 minute at HIGH or increase by 1 minute multiples each time this pad is pressed during Microwave, Convection, Grill or Mix cooking.
(See Note)

NOTE:
The directed features are disabled after one minute when the oven is not in use. These features are automatically enabled when the door is opened and closed or the STOP/ CLEAR pad is pressed.

OPERATION SEQUENCE

OFF CONDITION

Closing the door activates all door interlock switches (Right latch switch, Left latch switch and stop switch.)

IMPORTANT

When the oven door is closed, the monitor switch contacts COM-NC must be open.

When the microwave oven is plugged in a wall outlet, rated voltage is supplied to the point A9 + common terminal of relay RY1 in the control unit.

Figure O-1 on page 35

1. The display shows "SHARP", "MICRO-", "WAVE" and "OVEN".
2. To set any programmes or set the clock, you must first touch the STOP/CLEAR key.
3. " : " appears in the display and the time counts up every minute.

NOTE: When the oven door is opened, the oven lamp comes on at this time.

MICROWAVE COOKING CONDITION

HIGH COOKING

Select microwave cooking and power level by pressing the POWER LEVEL pad and enter desired cooking time by pressing NUMBER pads. When the START pad is touched, the following operations occur:

Function sequence Figure O-2 on page 35

CONNECTED COMPONENTS	RELAY
Oven lamp, Turntable motor (Power transformer)	RY1
Power transformer	RY2
Fan motor	RY6

1. Rated voltage is supplied to the primary winding of the power transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron generates a wave length of 12.24 cm. This energy is channelled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays (RY1+RY2+RY6) go back to their home position. The circuits to the oven lamp, power transformer, fan motor and turntable motor are cut off.
5. When the door is opened during a cook cycle, the switches come to the following condition.

Switch	Contact	During Cooking	Condition Oven Door Open(No cooking)
Right Latch Switch	COM-NO	Closed	Open
Monitor Switch	COM-NC	Open	Closed
Left Latch Switch	COM-NO	Closed	Open
Stop Switch	COM-NO	Closed	Open

The circuits to the power transformer and turntable motor are cut off when the right latch switch and left latch switch are made open. The fan motor is cut off when the stop switch is made open.

The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay (RY1) stays closed. Shown in the display is the remaining time.

6. MONITOR SWITCH CIRCUIT

The monitor switch is mechanically controlled by oven door, and monitors the operation of the right latch switch and left latch switch.

6-1. When the oven door is opened during or after the cycle of a cooking program, the contacts (COM-NC) of the monitor switch must be closed and the contacts (COM-NO) of the right latch switch, left latch switch and stop switch must be opened at the same time.

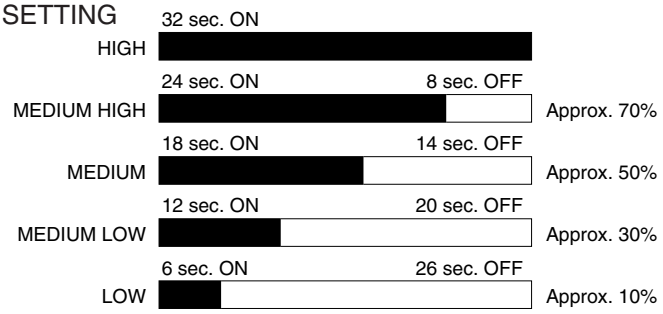
6-2. When the oven door is closed, the contacts (COM-NC) of the monitor switch must be opened and the contacts (COM-NO) of the right latch switch, left latch switch and stop switch must be closed at the same time.

6-3. When the oven door is opened and the contacts of the right latch switch and the left latch switch remain closed, the fuse M8A will blow, because the monitor switch and relay (RY1) are closed and a short circuit is caused.

MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW COOKING

When the microwave oven is preset for variable cooking power, rated voltage is supplied to the power transformer intermittently within a 32-second time base through the relay contact which is coupled with the current-limiting relay RY2. The following levels of microwave power are given.

SETTING



NOTE: The ON/OFF time ratio does not exactly correspond to the percentage of microwave power, because approx. 3 seconds are needed for heating up the magnetron filament.

CONVECTION COOKING CONDITION

PREHEATING CONDITION

Press the PREHEAT pad and then select preheating temperature by pressing the temperature pad. When the START pad is touched, the following operations occur:

1. The coil of shut-off relays RY1+RY5+RY6 are energized, the oven lamp, cooling fan motor, turntable motor and convection motor are turned on.

2. The coil of relay (RY4) is energized by the CPU unit. The damper is moved to the closed position, opening the damper switch contacts. The opening of the damper switch contacts sends a signal to the LSI on the CPU unit de-energizing the relay (RY4) and opening the circuit to the damper motor.
3. The coil of heater relay (RY3) is energized by the CPU unit and the main supply voltage is added to the convection heater.
4. When the oven temperature reaches the selected preheat temperature, the following operations occur:

4-1. The heater relay (RY3) is de-energized by the CPU unit temperature circuit and thermistor, opening the circuit to the convection heater.

4-2. The oven will continue to function for 30 minutes, turning the convection heater on and off, as needed to maintain the selected preheat temperature. The oven will shut-down completely after 30 minutes.

CONVECTION COOKING CONDITION

When the preheat temperature is reached, a beep signal will sound indicating that the holding temperature has been reached in the oven cavity. Open the door and place the food to be cooked in the oven. Program desired convection temperature and cooking time by touching the CONVECTION pad, Temperature pad and number pads. When the START pad is touched, the following operations occur:

1. The numbers of the digital read-out start the count down to zero.
2. The oven lamp, turntable motor, cooling fan motor and convection motor are energized.
3. Heater relay (RY3) is energized (if the cavity temperature is lower than the selected temperature) and the main supply voltage is applied to the convection heater to return to the selected cooking temperature.
4. Upon completion of the cooking time, the audible signal will sound, and oven lamp, turntable motor, cooling fan motor and convection motor are de-energized. At the end of the convection cycle, if the cavity air temperature is above 118˚C, the circuit to (RY6) will be maintained (by the thermistor circuit) to continue operation of the cooling fan motor until the temperature drops below 118˚C, at which time the relay will be de-energized, turning off the fan motor. Relay (RY5) will however, open as soon as the convection cycle has ended, turning off the convection fan motor. This will now cool and allow the damper door to open.
5. At the end of the convection cook cycle, shut-off relay (RY4) is energized turning on the damper motor. The damper is returned to the open position, closing the damper switch contacts which send a signal to the control unit, de-energizing shut-off relay (RY4).

MIX COOKING CONDITION

Program desired cooking time and Mix Cooking mode by touching the LOW MIX or HIGH MIX pad and number pads. When the START pad is touched, the following operations occur:

1. The numbers of the digital read-out start the count down to zero.
2. The shut-off relay (RY1+RY5+RY6) energized, turning on the oven lamp, turntable motor, cooling fan motor and convection motor.
3. The shut-off relay (RY4) is energized. The damper door is closed from the open position.
4. The heater relay (RY3) is energized, adding the mains supply voltage to the convection heater.
5. Now, the oven is in the convection cooking condition.
6. When the oven temperature reaches the selected temperature, the following operations occur:

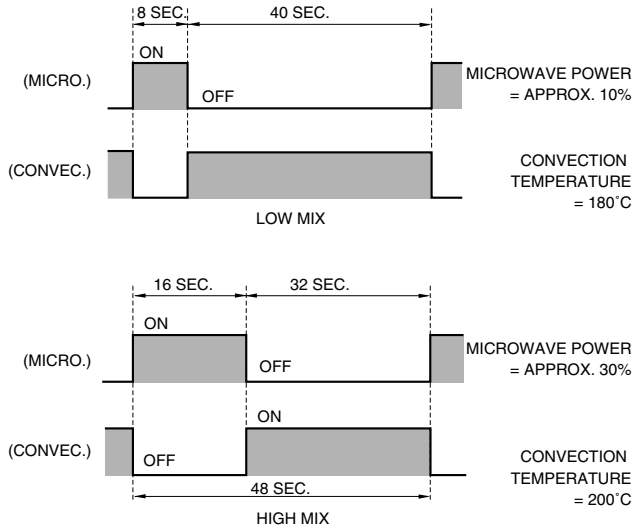
6-1. The power supply voltage is added to the convection heater and power transformer alternately.

6-2. The convection heater operates through the heater relay (RY3) contacts and the power transformer operates through the cook relay (RY2) contacts.

6-3. These are operated by the CPU unit to supply alternately within a 48 second time base, convection heat and microwave energy.

The relationship between the convection and microwave power operations are as follows.

Note: The ON and OFF time ratio does not correspond with the percentage of microwave power, because approx. 2 seconds are needed for heating of the magnetron filament.



Note: During alternate Microwave/Convection operation, the convection heater is energized only if the cavity temperature drops below the set temperature.

AUTOMATIC OPERATIONS

This microwave oven has 4 automatic operations as follows.

SENSOR INSTANT ACTION
REHEAT SENSOR
INTELLIGENT SENSOR
DEFROST SENSOR

These operations work by using absolute humidity sensor or weight sensor.

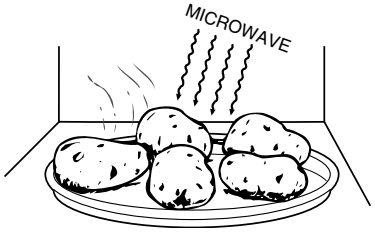
ABSOLUTE HUMIDITY SENSOR (AH SENSOR) COOKING CONDITION

Incase where the AH sensor is used, the foods are cooked in microwave cooking mode without figuring time, power level or quantity. When the oven senses enough steam from the food, it relays the information to its microprocessor which will calculate the remaining cooking time and power level needed for best results.

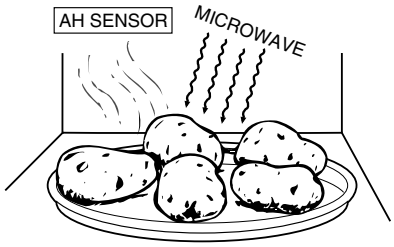
When the food is cooked, water vapour is developed. The

sensor "senses" the vapour and its resistance increases gradually. When the resistance reaches the value set according to the menu, supplementary cooking is started. The time of supplementary cooking is determined by experiment with each food category and inputted into the LSI.
An example of how sensor works:

1. Potatoes at room temperature. Vapour is emitted very slowly.



2. Heat potatoes. Moisture and humidity is emitted rapidly. You can smell the aroma as it cooks. ;



3. Sensor detects moisture and humidity and calculates cooking time and variable power.

AH SENSOR COOKING SEQUENCE

1. In case the AH sensor cooking condition is started, the coil of shut-off relays (RY1+RY6) are energized, the oven lamp and cooling fan motor are turned on, but the power transformer is not turned on.

NOTE: The oven should not be operated on AH SENSOR COOKING immediately after plugging in the unit. Wait five minutes before cooking on AH SENSOR COOKING CONDITION.

2. After about 16 seconds, the cook relay (RY2) is energized. The power transformer is turned on, microwave energy is produced and first stage is started. The 16 seconds is the cooling time required to remove any vapour from the oven cavity and sensor. Figure O-2

NOTE: During this first stage, do not open the door or touch STOP/CLEAR pad.

3. When the sensor detects the vapour emitted from the food, the display switches over to the remaining cooking time and the timer counts down to zero. At this time, the door may be opened to stir food, turn it or season, etc.

NOTE: In case where a small quantity of food is cooked, the oven will stop without displaying the remaining cooking time.

4. When the timer reaches zero, an audible signal sounds. The shut-off relay (RY1+RY6) and cook relay (RY2) are de-energized and the power transformer, oven lamp, etc. are turned off.
5 Opening the door or touching the STOP/CLEAR pad, the time of day will reappear on the display and the oven will revert to an OFF condition.

WEIGHT SENSOR COOKING CONDITION

In case where the weight sensor is used, the foods are cooked without figuring cooking mode, time, power leveller weight. When the oven sense the weight of food, it relays the information to its microprocessor which will set the cooking mode and will calculate the cooking time and power level needed for best results.

ACTIVATED SENSOR FOR SENSOR COOKING

The weight sensor and AH. sensor should be worked as following table.

Sensor Cooking	Menu	Weight Sensor	AH. Sensor
SENSOR INSTANT ACTION	Roast beef, Roast beef dinner	◯	
	Roast lamb, Roast lamb dinner	◯	
	Roast chicken	◯	
	Roast chicken dinner	◯	
	Fresh vegetable, Jacket Potato		◯
SENSOR REHEAT	Beverage, Soup		◯
	Dinner plate, Casserole		◯
	Canned food		◯
	Pie	◯	
	Pizza	◯	
INTELLIGENT SENSOR	Seasoned roast, Grilled fish	◯	
	Roast turkey, Roast pork	◯	
	Grilled steak/Chops, Biscuits	◯	
	Grilled Kebabs, Roast vegetable	◯	
	Frozen vegetables, Casseroles		◯
	Fish fillets, Corned meat		◯
	Rice/Pasta, Desserts		◯
	Soup, Preserves		◯
	Cake	-	-
	Fresh vegetables Hard		◯
	White Rice		◯
	Fresh Pasta, Dry Pasta		◯
	Instant Noodles		◯
	Frozen Pasta		◯
	Porridge		◯
	Stewed Fruit		◯
DEFROST SENSOR	All menus	◯	

The menu "Cake" of Intelligent sensor does not use neither the weight sensor nor the AH sensor.

FIRE SENSING FEATURE (MICROWAVE MODE)

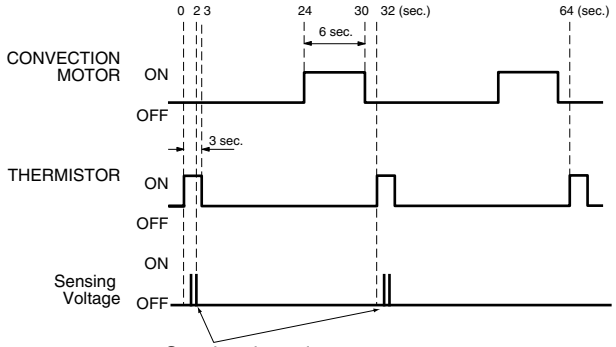
This model incorporates a sensing feature which will stop the oven's operation if there is a fire in the oven cavity during microwave cooking.
This accomplished by the LSI repeatedly measures the voltage across the temperature measurement circuit (thermistor) during it's 32-seconds time base comparing the obtained voltage measurements. If the most recent voltage measured is 300mV grater than the previous voltage measured, the LSI judges it as a fire in the oven cavity and switches off the relays to the power transformer, fan motor and convection motor. The LSI also stops counting down and closes the damper door so that no fresh air will enter the oven cavity. Please refer to the following section for a more detailed description.

Operation

Please refer to the timing diagrams below.
Following operation will start 4 minutes after the oven is started.

1. The thermistor operates within a 32-seconds time base and it is energized for three (3) seconds and off for 29 seconds. Two (2) seconds after the thermistor is energized, the voltage across the temperature measurement circuit is sampled by the LSI and twenty one (21) seconds after the thermistor is cut off the LSI turns on the cooling fan for six (6) seconds.
2. The above procedure is repeated. If the difference between the first voltage measured (in step 1) and the voltage measured when the procedure is repeated (step 2) is greater than 300mV the LSI makes the judgment that there is a fire in the oven cavity and will switch off the relays to the power transformer, fan motor and convection motor. The LSI also stops counting down and closes the damper door so that no fresh air will enter the oven cavity.
3. Once the fire sensor feature has shut the unit down, the programmed cooking cycle may be resumed by pressing the "START" pad or the unit may be reset by pressing the "CLEAR" pad.

IMPORTANT:
During sensor cooking operation, the fire sensing operation sequence will not begin until the AH sensor has detected vapours and initiated a sensor cooking cycle. This is because the operation of the convection fan would interfere with the AH sensor's vapour detection.



Sensing the voltage across temperature measurement circuit.

FUNCTION OF IMPORTANT COMPONENTS

RIGHT LATCH SWITCH AND LEFT LATCH SWITCH

1. When the oven door is closed, the contacts COM-NO must be closed.
2. When the oven door is opened, the contacts COM-NO must be opened.

STOP SWITCH

1. This switch must make a contact when the door is closed, and open it when the door is opened.

MONITOR SWITCH

The monitor switch is activated (the contacts opened) by the switch lever L on the latch hook (left) while the door is closed. The switch is intended to render the oven inoperative by means of blowing the fuse M8A when the contacts of the right latch switch and the left latch switch fail to open when the door is opened.

Function

1. When the door is opened, the monitor switch contacts close (to the ON condition) due to their being normally closed. At this time the right latch switch ;and the left latch switch are in the OFF condition (contacts open) due to their being normally open contact switches.
2. As the door goes to a closed position, the monitor switch contacts are opened and right latch switch, left latch switch and stop switch contacts close. (On opening the door, each of these switches operate inversely.)
3. If the door is opened and the contacts COM-NO of the right latch switch and left latch switch fail to open, the fuse M8A blows simultaneously with closing of the monitor switch contacts.

CAUTION: BEFORE REPLACING A BLOWN FUSE M8A TEST RIGHT LATCH SWITCH, THE LEFT LATCH SWITCH, MONITOR SWITCH AND MONITOR RESISTOR FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE").

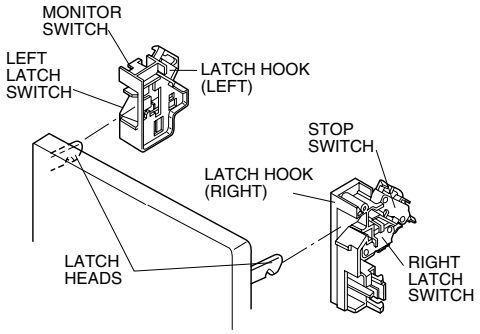


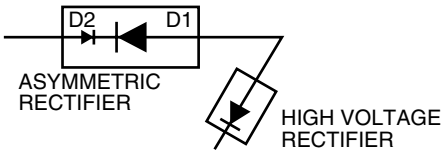
Figure D-1. Switches

MONITOR RESISTOR

The monitor resistor prevents the fuse M8A 250V bursting when the fuse M8A 250V blows due to the operation of the monitor switch.

ASYMMETRIC RECTIFIER

The asymmetric rectifier is a solid state device that prevents current flow ins both directions. And it prevents the temperature rise of the power transformer by blowing the fuse M8A when the high voltage rectifier is shorted.



The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 KV The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.7 KV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of blowing the fuse M8A.) .

1. The high voltage rectifier is shorted by any causes when microwave cooking.
2. The peak reverse voltage of D2 of the rectifier goes beyond the rated peak reverse voltage 1.7 KV in the voltagedoubler circuit.
3. D2 of the rectifier is shorted.
4. The large electric currents flow through the high voltagewinding of the power transformer.
5. The large electric currents beyond 8A flow through the primary winding of the power transformer.
6. The fuse M8A blows by the large electric currents.
7. The power supply to the power transformer is cut off.

FUSE M8A 250V

1. If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazard.
2. The fuse also blows when right latch switch and left latch switch remain closed with the oven door open and when the monitor switch closes.
3. The fuse M8A also blows when asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of power transformer is shorted.

THERMISTOR

The thermistor is a negative temperature coefficient type. The temperature in the oven cavity is detected through the resistance of the thermistor, and then the control unit causes the heating element relay to operate, thus the current to the heating element is turned ON/OFF.

TURNTABLE MOTOR

The turntable motor drives the turntable supporting plate to rotate the turntable.

CONVECTION MOTOR

The convection motor drives the convection fan and provides the heated air.

FAN MOTOR

The fan motor drives a blade which draws external cool air. This cool air is directed through the air vanes surrounding the magnetron and cools the magnetron. This air is channelled through the oven cavity to remove steam and vapours given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.

CONVECTION HEATER

The convection heater is located at the rear of the oven cavity. It is intended to heat air driven by the convection fan. The heated air is kept in the oven and force-circulated and reheated by the convection heater.

THERMAL CUT-OUT 150˚C (OVEN)

The thermal cut-out protects the convection motor against overheating. If its temperature rises above 150˚C because the convection fan motor is interrupted, the ventilation openings are obstructed or the other abnormal matter occurs, the thermal cut-out opens and switch off the oven. When the thermal cut-out cools itself down to 130˚C, the contacts of the thermal cut-out will close again.

THERMAL CUT-OUT 95˚C (FAN MOTOR)

The thermal cut-out protect the fan motor against overheating. If its temperature goes up higher than 95˚C because the fan motor is locked or the ventilation operating are blocked, the contacts of the thermal cut-out will open and switch off the oven. When the thermal cut-out cools itself down to 75˚C, the contacts of the thermal cut-out will close again.

TEMPERATURE FUSE 150˚C (MG)

This fuse protects the magnetron against overheating. If the temperature goes up higher than 150˚C because the fan motor is interrupted, the air inlet duct is blocked or the ventilation operating are obstructed, the fuse blows and cuts off the power supplying to the power transformer. The defective fuse must be replaced with new rated one.

THERMAL CUT-OUT 145˚C (MG)

This thermal cut-out protects the magnetron against overheating. If the temperature goes up higher than 145˚C because the fan motor is interrupted, the air inlet duct is blocked or the ventilation operating are obstructed, the fuse blows and cuts off the power supplying to the power transformer. The defective thermal cut-out must be replaced with new rated one.

CONVECTION COOKING SYSTEM

This oven is designed with a hot air heating system where food is not directly heated by the convection heater, but is heated by forced circulation of the hot air produced by the convection heater.

The air heated by the convection heater is circulated through the convection passage provided on the outer casing of the oven cavity by means of the convection fan which is driven by the convection motor. It then enters the inside of the oven through the vent holes provided on the left side of the oven. Next, the hot air heats the food on the turntable and leaves the oven cavity through the vent in the oven cavity left side wall.

Without leaving the oven, this hot air is reheated by the convection heater, passes through the convection passage and enters the inside of the oven cavity again, in a continuing cycle.

In this way, the hot air circulates inside the oven cavity to raise its temperature and, at the same time, comes into contact with the food being cooked.

When the temperature inside the oven cavity reaches the selected temperature, the convection heater is de-energized. When the temperature inside the oven cavity drops below the selected temperature, the convection heater is energized again. In this way, the inside of the oven cavity is maintained at approximately the selected temperature.

When the convection time reaches 0, the convection heater is deenergzed and the convection fan stops operating and the oven shuts off.

Upon completion of the cooking time, the audible signal will sound, and oven lamp, turntable motor, cooling fan motor and convection motor are de-energized. At the end of the convection cycle, if the cavity air temperature is above 118˚C, the circuit to RY6 will be maintained (by the thermistor circuit) to continue operation of the cooling fan motor until the temperature drops below 118˚C, at which time the relay will be de-energized, turning off the fan motor. Relay RY5 will however, open as soon as the convection cycle has ended, turning off the convection fan motor. This will now cool and allow the damper door to open.

DAMPER OPEN-CLOSE MECHANISM

Usually, the damper is in the open position except during convection cooking.

Damper position is set automatically by damper motor, damper switch, motor cam and damper shaft.

These components are operated by a signal that judges if microwave cooking or convection cooking operation is selected by the CPU unit.

Microwave Cooking:

Damper is in the open position, because a portion of cooling air is channelled through the cavity to remove steam and vapours given off from the heating foods.

It is then exhausted at the top of the oven cavity into a condensation compartment.

Convection Cooking:

Damper is in the closed position, so that no hot air will be allowed to leak out the oven cavity.

Damper Operation

1. When power supply cord is plugged in:

1-1. When power supply cord is plugged in, a signal is sensed in the control unit, and operates shut-off relay (RY4).

1-2. Contacts of shut-off relay (RY4) close, the damper motor is energized, opening the damper door.

1-3. When the damper is moved to the open position by the damper cam, damper switch is closed (ON position).

1-4. The signal of damper switch is re-sensed in the control unit and shut-off relay (RY4) is turned off.

1-5. The 240 volts A.C. to the damper motor is stopped and the motor turns off.

2. When oven is microwave cooking:
   Damper is in the open position

3. When oven is convection cooking:

3-1 Damper motor is energized by touching the convection, temperature and START pads.

3-2. When damper is in the closed position (damper switch is OFF), its signal is sensed by the control unit, and shut-off relay (RY4) is de-energized.

3-3. The damper is held in the closed position during the convection cooking operation

3-4. At the end of the convection cooking, shut-off relay (RY4) is energized, and the damper is returned to the open position.

NOTE: If the damper door is not in the proper position, closed during convection or open during microwave, the control unit will stop oven operation after 1 minute.

Cooking Mode	Operation of Damper
Microwave cooking	OPEN
Convection cooking	CLOSE
AH Sensor cooking	OPEN
.Mix cooking	CLOSE
Grill cooking	CLOSE

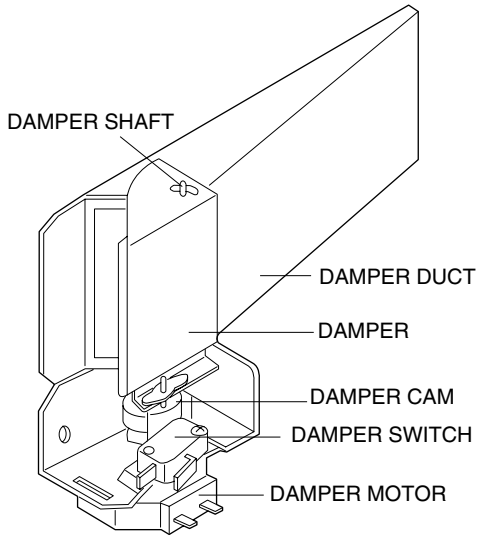
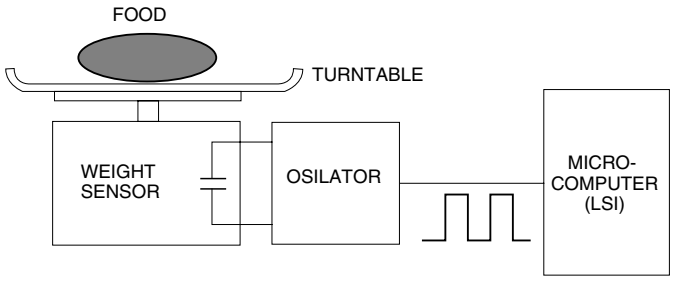


Figure D-2. Damper Mechanism

WEIGHT SENSOR ASSEMBLY

1. When the food is placed on the turntable, the gap between the electrodes increases in direct proportional to the weight of food. The electrodes have the function of a capacitor.
2. The frequency of the oscillator changes according to the capacitance of the weight sensor.
3. The micro-computer measures the weight of food by detecting the change in the oscillating frequency.



NOISE FILTER

The noise filter prevents the radio frequency interference that might flow back in the power circuit.

SERVICING

WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution. High voltage capacitor, Power transformer, Magnetron, High voltage rectifier assembly, High voltage harness.

REMEMBER TO CHECK 3D

1) Disconnect the supply.
2) Door opened, and wedged open.
3) Discharge high voltage capacitor.

WARNING: AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may, in some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the power transformer. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnect the leads to the primary of the power transformer.

REMEMBER TO CHECK 4R

1) Reconnect all leads removed from components during testing.
2) Replace the outer case (cabinet).
3) Reconnect the supply.
4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the microwave timer for two (2) minutes. Set the power level to HIGH and push the START button. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out 3D checks and re-examine the connections to the component being tested.

When all service work is completed, and the oven is fully assembled, the microwave power output should be checked and microwave leakage test carried out

TROUBLESHOOTING GUIDE

When troubleshooting the microwave oven,it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that aspecific test be performed. These tests are given a procedure letter which will be found in the "Test Procedure"section.

IMPORTANT: If the oven becomes inoperative because of a blown fuse M8A in the right latch switch - left latch switch - monitor switch - monitor resisitor circuit check the right latch switch, left latch switch, monitor switch and monitor resistor before replacing the fuse M8A

CK = Check / RE = Replace

TEST PROCEDURE		A	B	C	D	E	E	E	E	F	G	G	RE	J	J
CONDITION	POSSIBLE CAUSE AND DEFECTIVE PARTS / PROBLEM	MAGNETRON	POWER TRANSFORMER	H.V. RECTIFIER ASSEMBLY	HIGH VOLTAGE CAPACITOR	RIGHT LATCH SWITCH	LEFT LATCH SWITCH	STOP SWITCH	MONITOR SWITCH	FUSE M8A	TEMPERATURE FUSE	THERMAL CUT-OUT	OVEN LAMP OR SOCKET	FAN MOTOR	TURNTABLE MOTOR
OFF CONDITION	Home fuse blows when power supply cord is plugged into wall outlet.														
	Fuse M8A blows when the door is opened.					○	○								
	Fuse M8A blows when power cord is plugged into wall outlet.								○						
	88:88 does not appear in display when power cord is first plugged into wall outlet.									○	○	○			
	Display does not operate properly when STOP/ CLEAR pad is touched. (The time of day should appear on the display with beep sound during normal condition.)							○							
	Oven lamp does not light with door opened.												○		
COOKING CONDITION	Oven lamp does not light in cook cycle. (It light when door is opened)														
	Oven lamp does not light at all												○		
	Oven lamp light, but turntable motor does not operate.					○	○								○
	Cooling fan motor does not operate.													○	
	The oven stops after1 minute														
(MICROWAVE)	Oven does not go into a cook cycle, when START pad is touched.							○							
	Low or no power is produced during microwave cooking (The food is heated incompletely or not heated at all)	○	○	○	○										
	Extremely uneven heating is produced in oven load (food).														○
	Function of variable cooking does not operate properly except HIGH power.														
(CONVECTION)	CONV indicator lights, but oven does not go into cook cycle when START pad is touched.					○									
	CONV indicator lights, but heating element does not heat.														
	Temperature in the oven cavity is lower or higher than preset.														
	When preheating, the oven does not stop.														
	Convection cycle runs 3 minutes then the oven shuts down.														
(AH. SENSOR)	Oven is in the sensor cooking condition but AH sensor does not not stop cooking cycle.														
	Oven stops soon and display shows "ERROR"														
(WEIGHT SENSOR)	After START pad is touched, the oven stops and display shows "ADD", "TURN", "TABLE".														

J	H	I	J	E	Q	R	R	M	N	O	O	O	O	O	O	CK	CK	CK	CK	K	CK	CK	P	CK	CK	L
CONVECTION MOTOR																		○								
CONVECTION HEATER																	○							○		○
THERMISTOR								○								○			○				○			
DAMPER MOTOR																		○	○							
DAMPER SWITCH																			○							
AH. SENSOR								○								○							○			
WEIGHT SENSOR ASSEMBLY																										
IC-3 ON CONTROL UNIT																										
TOUCH CONTROL PANEL									○	○	○	○	○	○	○	○										
KEY UNIT																								○		
RELAY (RY-1)																										
RELAY (RY-2)																										
RELAY (RY-3)																										
RELAY (RY-4)																										
RELAY (RY-5)																										
RELAY (RY-6)																										
OPENED WIRE HARNESS																										
SHORTED WIRE HARNESS																										
POWER SUPPLY CORD																										
NO POWER AT WALL OUTLET																										
MONITOR RESISTOR																										
OPEN WIRING AT SENSOR																										
OPEN WIRING TO WEIGHT SENSOR																										
FOIL PATERN ON P.W.B.																										
SWITCH LEVER																										
OPEN WIRING TO THERMISTOR																										
NOISE FILTER																										

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

A **MAGNETRON TEST**

NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.

CARRY OUT 3D CHECK.

Isolate the magnetron from high voltage circuit by removing all leads connected to filament terminal.

To test for an open circuit filament use an ohmmeter to make a continuity test between the magnetron filament terminals, the meter should show a reading of less than 1 ohm.

To test for short filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an infinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

MICROWAVE OUTPUT POWER (1 Litre water load)

The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted). Microwave output power from the magnetron can be measured by IEC test procedure, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. When P(W) heating works for t(second), approximately P x t/4.187 calorie is generated. On the other hand, if the temperature of the water with V(ml) rises ΔT (°C) during this microwave heating period, the calorie of the water is V x ΔT.

The formula is as follows;

$P \times t / 4.187 = V \times \Delta T + 0.55 \times mc (T2-T0)/ 4.187$ $P (W) = 4.187 \times V \times \Delta T / t + 0.55 \times mc (T2-T0)/t$

Our condition for water load is as follows:

Room temperature (T0) ... around 20°C	Power supply Voltage ..... Rated voltage
Water load ..... 1000 g	Initial temperature (T1) ..... 10±1°C
Heating time ..... 47 sec.	Mass of container (mc) ..... 330 g
T2 ..... Final Temperature	$\Delta T = T2 - T1$ $P = 90 \times \Delta T + 0.55 \times mc (T2-T0)/47$

Measuring condition:

1. Container
   The water container must be a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190 mm.
2. Temperature of the oven and vessel
   The oven and the empty vessel are at ambient temperature prior to the start of the test.
3. Temperature of the water
   The initial temperature of the water is (10±1)˚C.
4. Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5˚C.
5. Select stirring devices and measuring instruments in order to minimize addition or removal of heat.
6. The graduation of the thermometer must be scaled by 0.1˚C at minimum and an accurate thermometer.
7. The water load must be (1000±5) g.
8. "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included.

NOTE: The operation time of the microwave oven is "t + 3" sec. 3 sec. is magnetron filament heat-up time.

Measuring method:

1. Measure the initial temperature of the water before the water is added to the vessel. (Example: The initial temperature T1 = 11˚C)
2. Add the 1 litre water to the vessel.
3. Place the load on the centre of the shelf.
4. Operate the microwave oven at HIGH for the temperature of the water rises by a value Δ T of 10 ˚C.
5. Stir the water to equalize temperature throughout the vessel.
6. Measure the final water temperature. (Example: The final temperature T2 = 21°C)
7. Calculate the microwave power output P in watts from above formula.

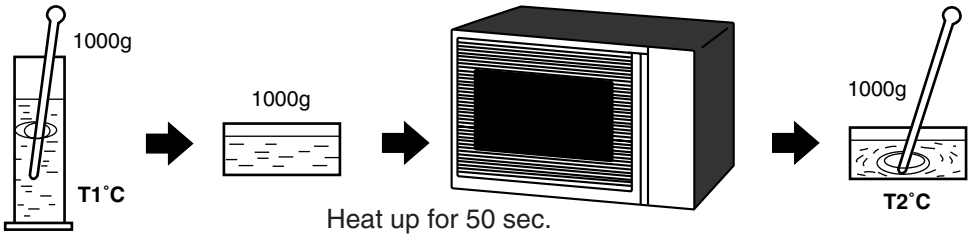
TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

Initial temperature	T1 = 11°C
Temperature after (47 + 3) = 50 sec.	T2 = 21°C
Temperature difference Cold-Warm (ΔT = T2 - T1)	ΔT = 10°C
Measured output power	
The equation is "P = 90 x ΔT"	P = 90 x 10°C = 900 Watts

JUDGMENT: The measured output power should be at least ± 15 % of the rated output power.

CAUTION: 1°C CORRESPONDS TO 90 WATTS REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



B **POWER TRANSFORMER TEST**

WARNING: High voltages and large currents are present at the secondary winding and filament winding of the power transformer. It is very dangerous to work near this part when the oven is on. NEVER make any voltage measurements of the high-voltage circuits, including the magnetron filament.

CARRY OUT 3D CHECKS.

Disconnect the leads to the primary winding of the power transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three windings. The following readings should be obtained:

a. Primary winding ..... approx. 1.1Ω
b. Secondary winding ..... approx. 68.5 Ω
c. Filament winding ..... less than 1Ω

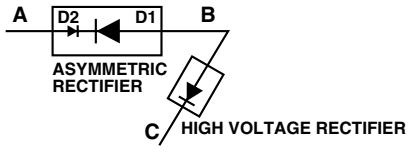
If the reading obtained are not stated as above, then the power transformer is probably faulty and should be replaced.

CARRY OUT 4R CHECKS.

C **HIGH VOLTAGE RECTIFIER ASSEMBLY TEST**

HIGH VOLTAGE RECTIFIER TEST
CARRY OUT 3D CHECKS.
Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than 100 kΩ in the other direction.

CARRY OUT 4R CHECKS.
ASYMMETRIC RECTIFIER TEST



CARRY OUT 3D CHECKS.

Isolate the high voltage rectifier assembly from the HV circuit. The asymmetric can be tested using an ohmmeter set to its highest range across the terminals A+B of the asymmetric rectifier and note the reading obtained. Reverse the meter leads and note this second reading. If an open circuit is indicated in both direction then the asymmetric rectifier is good. If an asymmetric rectifier is shorted in either direction, then the asymmetric rectifier is probably faulty and must be replaced with high voltage rectifier. When the asymmetric rectifier is defective, check whether magnetron, high voltage

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

rectifier, high voltage wire or filament winding of the power transformer is shorted.

CARRY OUT 4R CHECKS.

NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIER, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLTAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTIONS.

D **HIGH VOLTAGE CAPACITOR TEST**

CARRY OUT 3D CHECKS.

A. Isolate the high voltage capacitor from the circuit.
B. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
C. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10MΩ after it has been charged.
D. A short-circuited capacitor shows continuity all the time.
E. An open capacitor constantly shows a resistance about 10 MΩ because of its internal 10MΩ resistance.
F. When the internal wire is opened in the high voltage capacitor shows an infinite resistance.
G. The resistance across all the terminals and the chassis must be infinite when the capacitor is normal.

If incorrect reading are obtained, the high voltage capacitor must be replaced.

CARRY OUT 4R CHECKS.

E **SWITCH TEST**

CARRY OUT 3D CHECKS.

Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch

Plunger Operation	COM to NO	COM to NC
Released	Open Circuit	Short Circuit
Depressed	Short Circuit	Open Circuit

COM; Common terminal
NO; Normally open terminal
NC; Normally close terminal

If incorrect readings are obtained, make the necessary switch adjustment or replace the switch.

CARRY OUT 4R CHECKS.

F **BLOWN FUSE M8A**

CARRY OUT 3D CHECKS.

1. If the fuse M8A is blown, there could be shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.
2. If the fuse M8A is blown when the door is opened, check the upper latch switch, lower latch switch, monitor switch and monitor resistor.

   If the fuse M8A is blown by incorrect door switching, replace the defective switch(s) and the fuse M8A.
3. If the fuse M8A is blown, there could be short in the asymmetric rectifier or there is a ground in wire harness. A short in the asymmetric rectifier may have occured due to short or ground in H.V. rectifier, magnetron, power transformer or H.V. wire. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

CAUTION: Only replace fuse with the correct value replacement.

G **TEMPERATURE FUSE AND THERMAL CUT-OUT TEST**

CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of the temp. fuse or thermal cut-out. Then using an ohmmeter, make a continuity test across the two terminals as described in the table below.

CARRY OUT 4R CHECKS.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

Table: Temperature Fuse and Thermal cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit) (˚C)	Temperature of "OFF" condition (open circuit) (˚C)	Indication ofohmmeter (When room temperature is approx. 20˚C)
Temp. fuse 150˚C (MG)	This is not resetable type.	Above 150 ˚C	Closed circuit
Thermal cut-out 145˚C(MG)	This is not resetable type.	Above 145˚C	Closed circuit.
Thermal cut-out 150˚C(OVEN)	Below 130˚C	Above 150˚C	Closed circuit.
Thermal cut-out 95˚C(FM)	Below 75˚C	Above 95˚C	Closed circuit.

If incorrect readings are obtained, replace the temperature fuse or thermal cut-out.;

An open circuit temperature fuse 150˚C (MG)/ thermal cut-out 145˚C (MG) indicates that the magnetron has overheated, this may be due to resistricted ventilation, cooling fan failure or a fault condition within the magnetron or HV circuit.

An open circuit thermal cut-out 150˚C (OVEN) indicates that the convection motor has over heated, this may be due to convection motor locked.

An open circuit thermal cut-out 95˚C (FM) indicates that the fan motor winding has overheated, this may be due to blocked ventilation or locked cooling fan.

H **CONVECTION HEATER TEST**

CARRY OUT 3D CHECKS.

Before carring out the following tests make sure the heater is fully cool.

1. Resistance of heater
   Disconnect the wire leads to the heater to be tested. Using ohmmeter with low resistance range. Check the resistance across the terminals of the heater.
   The resistance of heater is approximately 37.5 ohms.
2. Insulation resistance
   Disconnect the wire leads to the heater to be tested. Check the insulation resistance between the element and cavity using a 500V - 100Mohms insulation tester. The insulation resistance should be more than 10Mohms in the cold start.

If the results of above test 1 and/or 2 are out of above specifications, the heater is probably faulty and should be replaced.

CARRY OUT 4R CHECKS.

I **THERMISTOR TEST**

CARRY OUT 3D CHECKS.

Disconnect connector-E from the CPU unit. Measure the resistance of the thermistor with an ohmmeter. Connect the ohmmeter leads to Pin No's E-3 and E-4 of the thermistor harness.

Room Temp. ..... 20˚C - 30˚C
Resistance ..... Approx. 326kΩ - 175kΩ

If the meter does not indicate above resistance, replace the thermistor.

CARRY OUT 4R CHECKS.

J **MOTOR WINDING TEST**

CARRY OUT 3D CHECKS.
Disconnect the leads from the motor.
Using an ohmmeter, check the resistance between the two terminals as described in the table below.

Table: Resistance of Motor

Motors	Resistance
Fan motor	Approximately 295 Ω
Turntable motor	Approximately 12 kΩ
Convection fan motor	Approximately 210 Ω
Damper motor	Approximately 11 kΩ

If incorrect readings are obtained, replace the motor. CARRY OUT 4R CHECKS.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

K **MONITOR RESISTOR TEST**

CARRY OUT 3D CHECKS.

Disconnect the leads from the monitor resist. Using an ohmmeter and set on a low range. Check between the terminals of the monitor resistor.

The resistance of monitor resistor is approx. 0.8 ohms.

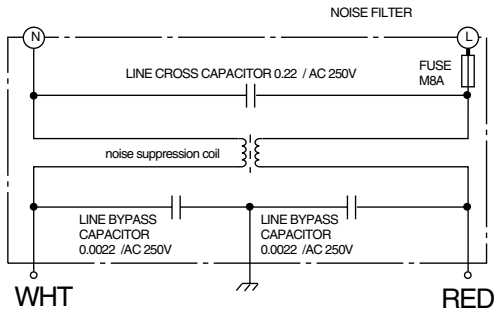
If incorrect readings are obtained, replace the monitor resistor.

CARRY OUT 4R CHECKS.

L **NOISE FILTER TEST.**

CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of the noise filter. Using an ohmmeter, check between the terminals as described in the following table.
If incorrect readings are obtained, replace the noise filter unit.



MEASURING POINT	INDICATION OF OHMMETER
Between N and L	Open circuit
Between terminal N and WHITE	Short circuit
Between terminal L and RED	Short circuit

CARRY OUT 4R CHECKS.

M **TOUCH CONTROL PANEL ASSEMBLY TEST**

The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into two units, Control Unit and Key Unit and troubleshooting by unit replacement is described according to the symptoms indicated.

1. Key Unit. Note: Check key unit ribbon connection before replacement.
   The following symptoms indicate a defective key unit. Replace the key unit.
   a) When touching the pads, a certain pad produces no signal at all.
   b) When touching a number pad, two figures or more are displayed.
   c) When touching the pads, sometimes a pad produces no signal.
2. Control Unit.
   The following symptoms indicate a defective control unit. Replacethe control unit.

2-1 In connection with pads.
   a) When touching the pads, a certain group of pads do not produce a signal.
   b) When touching the pads, no pads produce a signal.

2-2 In connection with indicators.
   a) At a certain digit, all or some segments do not light up.
   b) At a certain digit, brightness is low.
   c) Only one indicator does not light.
   d) The corresponding segments of all digits do not light up; or they continue to light up.
   e) Wrong figure appears.
   f) A certain group of indicators do not light up.
   g) The figure of all digits flicker.

2-3 Other possible troubles caused by defective control unit.
   a) Buzzer does not sound or continues to sound.
   b) Clock does not operate properly.
   c) Cooking is not possible.
   d) Proper temperature measurement is not obtained.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

N **KEY UNIT TEST**

If the display fails to clear when the STOP/CLEAR pad is depressed, first verify the flat ribbon is making good contact, verify that the door sensing switch (stop switch) operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the door sensing switch (stop switch) is good, disconnect the flat ribbon that connects the key unit to the control unit and make sure the door sensing switch is closed (either close the door or short the door sensing switch connector). Use the key unit matrix indicated on the control panel schematic and place a jumper wire between the pins that correspond to the STOP/CLEAR pad making momentary contact. If the control unit responds by clearing with a beep the key unit is faulty and must be replaced. If the control unit does not respond, it is faulty and must be replaced. If a specific pad does not respond, the above method may be used (after clearing the control unit) to determine if the control unit or key pad is at fault.

	G 5	G 6	G 7	G 8	G 9	G10	G11	G12
G 4	Roast Beef / Dinner	CLOCK	INSTANT COOK / START	1 40˚C	2 70˚C	3 130˚C	4 150˚C	5 160˚C
G 3	Roast Lamb / Dinner	STOP / CLEAR	LOW MIX	6 180˚C	7 200˚C	8 220˚C	9 230˚C	0 250˚C
G 2	WEIGHT ADJUST	HELP	HIGH MIX	Roast Chicken / Dinner	MEMORY	PREHEAT	LESS	MORE
G 1	INTELLIGENT SENSOR	FRESH VEGETABLES	POWER LEVEL	REHEAT SENSOR	DEFROST SENSOR	GRILL	CONVEC	JACKET POTATO

O **RELAY TEST**

Remove the outer case and check voltage between Pin No 9 of the 5-pin connector (A) and the common terminal of the relay RY1 on the control unit with an A.C. voltmeter. The meter should indicate 230 - 240 volts, if not check oven circuit.

Shut-off, Cook and Heater Relay Test
These relays are operated by D.C. voltage.
Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation or convection cooking operation.

DC. voltage indicated ..... Defective relay.
DC. voltage not indicated ..... Check diode which is connected to the relay coil. If diode is good, control unit is defective.

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	APPROX. 21.0V D.C.	Oven lamp / Turntable motor
RY2(COOK)	APPROX. 21.0V D.C.	Power transformer
RY3(HEATER)	APPROX. 20.0V D.C.	Heating element
RY4	APPROX. 21.0V D.C.	Damper motor
RY5	APPROX. 21.0V D.C.	Convection motor
RY6	APPROX. 21.0V D.C.	Cooling fan motor

P **PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN**

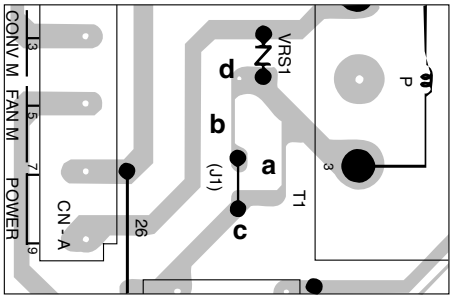
To protect the electronic circuits, this model is provided with a fine foil pattern added to the primary on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.

STEPS	OCCURRENCE	CAUSE OR CORRECTION
1	The rated voltage is not applied between Pin No. 9 of the 5-pin connector (A) and the common terminal of the relay RY1.	Check supply voltage and oven power cord.
2	The rated voltage is applied to primary side of power transformer.	Power transformer or secondary circuit defective. Check and repair.
3	Only pattern at "a" is broken.	*Insert jumper wire J1 and solder.
4	Pattern at "a" and "b" are broken.	*Insert the coil RCILF2003YAZZ between "c" and "d".

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

NOTE: *At the time of making these repairs, make a visual inspection of the varistor. check for burned damage and examine the transformer with an ohmmeter for the presence of layer short-circuit (check primary coil resistance). If any abnormal condition is detected, replace the defective parts.



Q **AH SENSOR TEST**

Checking the initial sensor cooking condition

(1) The oven should be plugged in at least five minutes before sensor cooking.
(2) Room temperature should not exceed 35˚C.
(3) The unit should not be installed in any area where heat and steam are generated. The unit should not be installed, for example, next to a conventional surface unit. Refer to the INSTALLATION INSTRUCTIONS of the operation manual.
(4) Exhaust vents are provided on the back of the unit for proper cooling and air flow in the cavity. To permit adequate ventilation, be sure to install so as not to block these vents. There should be some space for air circulation.
(5) Be sure the exterior of the cooking container and the interior of the oven are dry. Wipe off any moisture with a dry cloth or paper towel.
(6) The Sensor works with food at normal storage temperature.For example, chicken pieces would be at refrigerator temperature and canned soup at room temperature.
(7) Avoid using aerosol sprays or cleaning solvents near the oven while using Sensor settings. The sensor will detect the vapor given of by the spray and turn off before food is properly cooked.
(8) After the oven is started on sensor cooking condition, if the sensor has not detected the vapor of the food, ERROR will appear and the oven will shut off.

Water load cooking test

Make sure the oven has been plugged in at least five minutes before checking sensor cook operation. The cabinet should be installed and screws tightened.
(1) Fill approximately 200 milliliters (7.2 oz) of tap water in a 1000 milliliter measuring cup.
(2) Place the container on the center of tray in the oven cavity.
(3) Close the door.
(4) Touch REHEAT SENSOR pad five times and touch the INSTANT COOK/START pad. Now, the oven is in the sensor cooking condition and "CASSE-", "ROLES", "CANNED", "FOOD", "SENSOR" and "REHEAT" will appear in the display.
(5) The oven will operate for the first 16 seconds, without generating microwave energy.

When the AH sensor is defective (open or short), ERROR will appear in the display after 16 seconds cleaning time.
If ERROR appears check sensor wire connections and/or AH sensor.
NOTE: ERROR will appear if the door is opend or STOP/CLEAR pad is touched during first stage of sensor cooking.
(6) After approximately 16 seconds, microwave energy is produced, and the display start to count down the remaining cooking time and the oven should turn off after water is boiling (bubling).
If the oven does not turn off, replace the AH sensor or check the control unit, refer to explanation below.

TESTING METHOD FOR AH SENSOR AND/OR CONTROL UNIT

To determine if the sensor is defective, the simplest method is to replace it with a new replacement sensor.
(1) Disconnect oven from power supply and remove outer case.
(2) Discharge the high voltage capacitor.
(3) Remove the AH sensor.
(4) Install the new AH sensor.
(5) Re-install the outer case.
(6) Reconnect the oven to the power supply and check the sensor cook operation, proceed as follows:

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

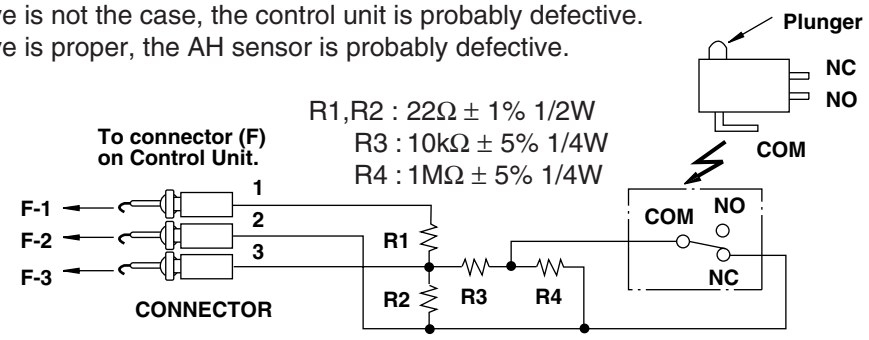
6-1. Fill approximately 200 milliliters (7.2 oz) of tap water in a 1000 milliliter measuring cup.
6-2. Place the container on the center of tray in the oven cavity.
6-3. Close the door.
6-4. Touch REHEAT SENSOR pad five times and touch the INSTANT COOK/START pad.
6-5. The control panel is in automatic Sensor operation.
6-6. The display will start to count down the remaining cooking time, and the oven will turn off automatically after the water is boiling (bubling).

If new sensor dose not operate properly, the problem is with the control unit.

CHECKING CONTROL UNIT

NOTE : When the following test is carried out, all connectors should be connected to the control unit.
(1) Disconnect oven from power supply and remove outer case.
(2) Discharge the high voltage capacitor.
(3) Disconnect the wire leads from the cook relay.
(4) Disconnect the sensor connector that is mounted to control panel.
(5) Then connect the dummy resistor circuit (see fig.) to the sensor connector of control panel.
(6) Reconnect the oven to the power supply and check the sensor cook operation, proceed as follows:
6-1. Touch REHEAT SENSOR pad five times and touch the INSTANT COOK/START pad.
6-2. The control panel is in the sensor cooking operation.
6-3. After approximately 20 seconds, push plunger of select switch. This condition is same as judgement by AH sensor.
6-4. After approximately 3 seconds, cooking operation turns off, an audible signal will sound.

If the above is not the case, the control unit is probably defective.
If the above is proper, the AH sensor is probably defective.



Sensor Dummy Resistor Circuit

R **WEIGHT SENSOR ASSEMBLY AND IC3(MEMORY) TEST**

After replacing the weight sensor or IC3, carry out the following procedure in order to calibrate the weight sensor. If the weight sensor is not recalibrate, the food may be over or under cooked.

The following procedure should be carried out with microwave oven in a fully assembled condition (with outer case fitted).

1. Place the turnrable on the turntable support plate correctly, and close the door.
2. Plug the oven into a power point. ("88:88" will appear on the display.)
3. After 3 seconds or more, Press the STOP/CLEAR pad. (Display shows " **:** " with sound of buzzer.)
4. Press the CLOCK pad. (Display shows "**ENTER TIME**" with sound of buzzer.)
5. Press the POWER LEVEL pad twice. (Display shows "**ENTER TIME**".)
6. Press the INSTANT COOK/START pad. (Display shows "**TEST**" with sound of buzzer.)
7. Press the "4" of number pads. (Display shows "**DISH**" with sound of buzzer, and tuntable and oven lamps come on.)
8. After 13 seconds, make sure that the display shows "**25000 - 35000**" with sound of buzzer.

If display shows less than 25000 or more than 35000, weight sensor is defect.

9. Place the weight 2 Kg ± 20g (water load 2 Kg ± 20g) on the turntable.
10. Press the "6" of number pads. (Display shows " DISH" with sound of buzzer, and turntable and oven lamps come on.)
11. After 13 seconds, make sure that the display shows "**01800 - 03200**" with sound of buzzer.

If display shows less than 01800 or more than 03200, weight sensor is defect.

12. Place the weight 2 Kg ± 20g (water load 2 Kg ± 20g) on the turntable.

TEST PROCEDURES	
PROCEDURE LETTER	**COMPONENT TEST**
	13. Press the POWER LEVEL pad, and make sure that the display shows "**01900 - 02100**". 14. Disconnect the oven from power supply, and repeat above procedure items 1 to 7. 15. Press the "7" of number pads, and make sure that the display shows "**01800 - 03200**". **If display shows less than 01800 or more than 03200, IC3 is defect.**

TOUCH CONTROL PANEL ASSEMBLY

OUTLINE OF TOUCH CONTROL PANEL

The touch control section consists of the following units as shown in the touch control panel circuit.

(1) Key Unit
(2) Control Unit

The principal functions of these units and the signals communicated among them are explained below.

Key Unit
The key unit is composed of a matrix, signals generated in the LSI are sent to the key unit through P10-P17.
When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through R24-R27 to perform the function that was requested.

Control Unit
Control unit consists of LSI, power source circuit, synchronizing signal circuit, ACL circuit, buzzer circuit, temperature measurement circuit, absolute humidity sensor circuit, weight sensor circuit and indicator circuit.

1) LSI (IC1)
This LSI controls the temperature measurement signal, AH sensor signal, weight sensor signal, key strobe signal, relay driving signal for oven function and indicator signal.

2) Memory IC (IC3)
This is memory IC, responsible for memory function.

3) Power Source Circuit
This circuit generates the voltages necessary for the control unit from the AC line voltage.

4) Synchronizing Signal Circuit
The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit. It incorporates a very small error because it works on commercial frequency.

5) ACL Circuit
A circuit to generate a signals which resetting the LSI to the initial state when power is applied.

6) Buzzer Circuit
The buzzer is responds to signals from the LSI to emit audible sounds (key touch sound and completion sound).

7) Temperature Measurement Circuit : (OVEN THERMISTOR)
The temperature in the oven cavity is sensed by the thermistor. The variation of resistance according to sensed temperature is detected by the temperature measurement circuit and the result applied to LSI. The LSI uses this information to control the relay and display units.

8) Absolute Humidity Sensor Circuit
This circuit detects the humidity of a food which is being cooked, to control its automatic cooking.

9) Weight Sensor Circuit
This circuit detects the weight of a food (with a container) which is placed on the turntable, to control its automatic cooking.

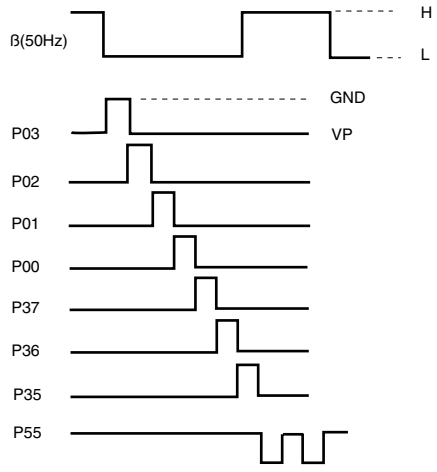
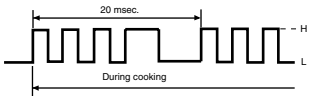
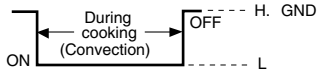
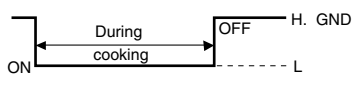
10)Door Sensing Switch
A switch to inform the LSI if the door is open or closed.

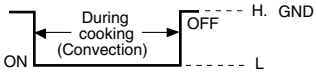
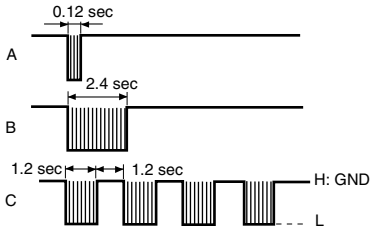
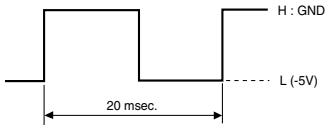
11) Relay Circuit
To drive the magnetron, heating element, fan motor, convection motor, damper motor, turntable motor and light the oven lamp.

12) Indicator Circuit
Indicator element is a Fluorescent Display.
Basically, a Fluorescent Display is triode having a cathode, a grid and an anode. Usually, the cathode of a Fluorescent Display is directly heated and the filament serves as cathode.
The Fluorescent Display has 8-digits, 16-segments are used for displaying figures.

DESCRIPTION OF LSI

LSI(IZA723DR):
The I/O signals of the LSI(IZA723DR) are detailed in the following table.

Pin No.	Signal	I/O	Description
1	VCC	IN	Connected to GND.
2	VEE	IN	**Anode (segment) of Fluorescent Display light-up voltage: -30V.** Vp voltage of power source circuit input.
3	AVSS	IN	**Power source voltage: -5V.** VC voltage of power source circuit input.
4	VREF	IN	**Reference voltage input terminal.** A reference voltage applied to the A/D converter in the LSI. Connected to GND.(0V)
5	AN7	IN	Used for initial balancing of the bridge circuit (absolute humidity sensor). This input is an analog input terminal from the AH sensor circuit, and connected to the A/D coverter built into the LSI.
6	AN6	IN	**AH sensor input.** This input is an analog input terminal from the AH sensor circuit, and connected to the A/D converter built into the LSI.
7-9	AN5-AN3	IN	**Heating constant compensation terminal.**
10	AN2	IN	**Input signal which communicates the door open/close information to LSI.** Door closed; "H" level signal(0V). Door opened; "L" level signal(-5V).
11	AN1	IN	**Input signal which communicates the damper open/close information to LSI.** Damper opened; "H" level signal(0V:GND). Damper closed; "L" level signal(-5V).
12	AN0	IN	**Temperature measurement input: OVEN THERMISTOR.** By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.
13	P55	OUT	**Digit selection signal.** The relationship between digit signal and digit are as follows; Digit signal — Digit P03 ..... 1st. P02 ..... 2nd. P01 ..... 3rd. P00 ..... 4th. P37 ..... 5th. P36 ..... 6th. P35 ..... 7th. P55 ..... 8th. Normally, one pulse is output in every ß period, and input to the grid of the Fluorescent Display. 
14	P54	OUT	**Oven lamp and turntable motor driving signal. (Square Waveform : 50Hz)** To turn on and off the shut-off relay(RY1). The square waveform voltage is delivered to the relay(RY1) driving circuit. 
15	P53	OUT	**Convection motor driving signal.** To turn on and off shut-off relay(RY5). "L" level during CONVECTION; "H" level otherwise. 
16	P52	OUT	**Cooling fan motor driving signal.** To turn on and off shut-off relay(RY6). "L" level during both microwave and convection cooking; "H" level otherwise. 

Pin No.	Signal	I/O	Description
17	P51	OUT	**Magnetron high-voltage circuit driving signal.** To turn on and off the cook relay(RY2). In HIGH operation, the signals holds "L" level during microwave cooking and "H" level while not cooking. In other cooking modes (MED HIGH, MED, MED LOW, LOW) the signal turns to "H" level and "L" level in repetition according to the power level. VARI MODE / ON TIME / OFF TIME: HIGH (100% power) 32 sec. 0 sec. MED HIGH (approx. 70% power) 24 sec. 8 sec. MED (approx. 50% power) 18 sec. 14 sec. MED LOW (approx. 30% power) 12 sec. 20 sec. LOW (approx. 10% power) 6 sec. 26 sec.
18	P50	OUT	**Damper motor relay driving signal.** To turn on and off shut-off relay(RY4).
19	P47	OUT	**Heating element driving signal.** To turn on and off shut-off relay(RY3). "L" level during convection cooking; "H" level otherwise. During convection cooking, the signal becomes "H" level when the temperature of the oven cavity exceeds the predetermined temperature. 
20	P46	OUT	Clock signal to IC3.
21	P45	OUT	Data signal output from IC3 and input to IC3.
22	P44	OUT	**Timing signal output terminal for temperature measurement(OVEN THERMISTOR).** "H" level (GND) : Ttermistor OPEN timing. "L" level (-5V) : Temperature measuring timing.(Convection cooking)
23	P43	OUT	**Signal to sound buzzer.** A: key touch sound. B: Completion sound. C: When the temperature of the oven cavity reaches the preset temperature in the preheating mode, or when the preheating hold time (30 minutes) is elapsed. 
24	P42	OUT	**Timing signal output terminal for temperature measurement(OVEN).** "H" level (GND) : Ttermistor OPEN timing. "L" level (-5V) : Temperature measuring timing.(Convection cooking)
25	INT1	IN	**Signal to synchronize LSI with commercial power source freqency.** This is the basic timing for all real time processing of LSI. 
26	P40	IN	Connected to GND.
27	RST	IN	**Auto clear terminal.** Signal is input to reset the LSI to the initial state when power is applied. Temporarily set to "L" level the moment power is applied, at this time the LSI is reset. Thereafter set at "H" level.
28	XCIN	IN	Weight sensor data input.
29	XCOUT	OUT	Terminal not used.
30	XIN	IN	**Internal clock oscillation frequency setting input.** The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XOUT terminal.
31	XOUT	OUT	**Internal clock oscillation frequency control output.** Output to control oscillation input of XIN.
32	VSS	IN	**Power source voltage: -5V.** VC voltage of power source circuit input.
33	P27	IN	**Signal coming from touch key.** When any one of G-1 line keys on key matrix is touched, a corresponding signal from P10 - P17 will be input into P27. When no key is touched, the signal is held at "L" level.

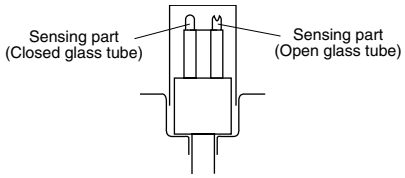
Pin No.	Signal	I/O	Description
34	P26	IN	**Signal similar to P27.** When any one of G-2 line key on key matrix is touched, a corresponding signal will be input into P26.
35	P25	IN	**Signal similar to P27.** When any one of G-3 line key on key matrix is touched, a corresponding signal will be input into P25.
36	P24	IN	**Signal similar to P27.** When any one of G-4 line key on key matrix is touched, a corresponding signal will be input into P24.
37	P23	OUT	**Segment data signals.** The relation between signals and indicators are as follows: Signal Segment Signal Segment Signal Segment Signa lSegment P23 ..... P1 P17 ..... P5 P13 ..... P9 P07 ..... P13 P22 ..... P2 P16 ..... P6 P12 ..... P10 P06 ..... P14 P21 ..... P3 P15 ..... P7 P11 ..... P11 P05 ..... P15 P20 ..... P4 P14 ..... P8 P10 ..... P12 P04 ..... P16
38-40	P22-P20	OUT	**Segment data signal.** Signal similar to P23.
41	P17	OUT	**Segment data signal.** Signal similar to P23. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P24-P27 terminal while one of G-12 line keys on key matrix is touched.
42	P16	OUT	**Segment data signal.** Signal similar to P23. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P24-P27 terminal while one of G-11 line keys on key matrix is touched.
43	P15	OUT	**Segment data signal.** Signal similar to P23. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P24-P27 terminal while one of G-10 line keys on key matrix is touched.
44	P14	OUT	**Segment data signal.** Signal similar to P23. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P24-P27 terminal while one of G-9 line keys on key matrix is touched.
45	P13	OUT	**Segment data signal.** Signal similar to P23. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P24-P27 terminal while one of G-8 line keys on key matrix is touched.
46	P12	OUT	**Segment data signal.** Signal similar to P23. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P24-P27 terminal while one of G-7 line keys on key matrix is touched.
47	P11	OUT	**Segment data signal.** Signal similar to P23. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P24-P27 terminal while one of G-6 line keys on key matrix is touched.
48	P10	OUT	**Segment data signal.** Signal similar to P23. **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P24-P27 terminal while one of G-5 line keys on key matrix is touched.

Pin No.	Signal	I/O	Description
49-53	P07-P03	OUT	**Segment data signal.** Signal similar to P23.
54-56	P02-P00	OUT	**Digit selection signal.** Signal similar to P55.
57-59	P37-P35	OUT	**Digit selection signal.** Signal similar to P55.
60-64	P34-P30	OUT	Used for initial balancing of the bridge circuit (absolute humidity sensor).

ABSOLUTE HUMIDITY SENSOR CIRCUIT

1) Structure of Absolute Humidity Sensor

The absolute humidity sensor includes two thermistors as shown in the illustration. One thermistor is housed in the closed vessel filled with dry air while another in the open vessel. Each sensor is provided with the protective cover made of metal mesh to be protected from the external airflow.

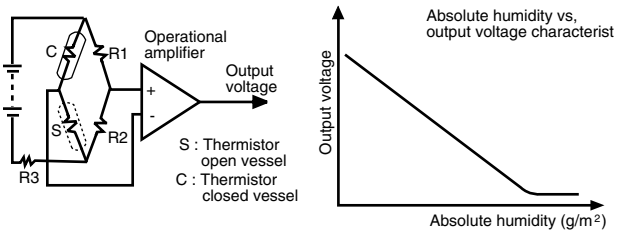


(2) Operational Principle of Absolute Humidity Sensor

The figure below shows the basic structure of an absolute humidity sensor. A bridge circuit is formed by two thermistors and two resistors (R1 and R2).

The output of the bridge circuit is to be amplified by the operational amplifier.

Each thermistor is supplied with a current to keep it heated at about 150˚C (302˚F), the resultant heat is dissipated in the air and if the two thermistors are placed in different humidity conditions they show different degrees of heat conductivity leading to a potential difference between them causing an output voltage from the bridge circuit, the intensity of which is increased as the absolute humidity of the air increases. Since the output is very minute, it is amplified by the operational amplifier.



(3) Detector Circuit of Absolute Humidity Sensor Circuit

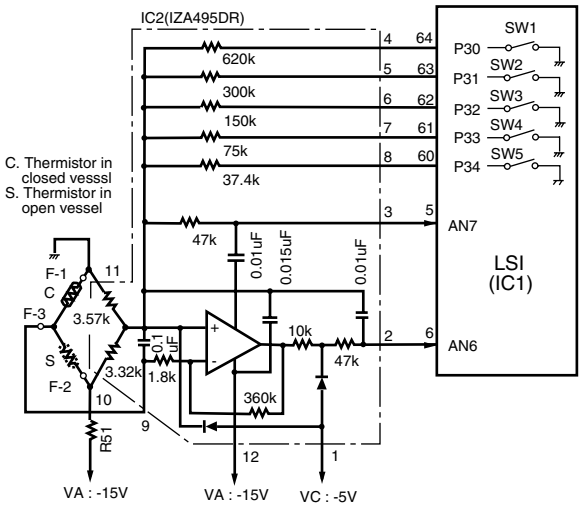
This detector circuit is used to detect the output voltage of the absolute humidity circuit to allow the LSI to control sensor cooking of the unit. When the unit is set in the sensor cooking mode, 16 seconds clearing cycle occurs than the detector circuit starts to function and the LSI observes the initial voltage available at its AN6 terminal.

With this voltage given, the switches SW1 to SW5 in the LSI are turned on in such a way as to change the resistance values in parallel with R50-1. Changing the resistance values results in that there is the same potential at both F-3 terminal of the absolute humidity sensor and AN7 terminal of the LSI. The voltage of AN6 terminal will indicate about -2.5V. This initial balancing is set up about 16 seconds after the unit is put in the Sensor Cooking mode. As the sensor cooking proceeds, the food is heated to generate moisture by which the resistance balance of the bridge circuit is deviated to increase the voltage available at AN6 terminal of the LSI.

Then the LSI observes that voltage at AN6 terminal and compares it with its initial value, and when the comparison rate reaches the preset value (fixed for each menu to be cooked), the LSI causes the unit to stop sensor cooking; thereafter, the unit goes in the next operation automatically.

When the LSI starts to detect the initial voltage at AN6 terminal 16 seconds after the unit has been put in the Sensor Cooking mode, if it is not possible to balance, of the bridge circuit due to disconnection of the absolute humidity sensor, ERROR will appear on the display and the cooking is stopped.

1) Absolute humidity sensor circuit



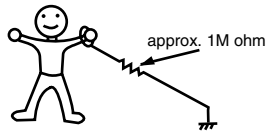
SERVICING

1. Precautions for Handling Electronic Components

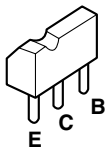
This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc, and sometimes it is not fully protected by the built-in protection circuit.

In order to protect CMOS LSI.

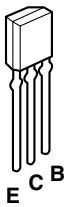
1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap all PW boards containing them in aluminium foil.
2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Shapes of Electronic Components



Transistor
2SB1238



Transistor
DTA123ES
KRA101M
KRA223M
KRC243M

3. Servicing of Touch Control Panel

We describe the procedures to permit servicing of the touch control panel of the microwave oven and the precautions you must take when doing so. To perform the servicing, power to the touch control panel is available either from the power line of the oven itself or from an external power source.

(1) Servicing the touch control panel with power supply of the oven:

CAUTION:

THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL LIVE DURING SERVICING PRESENTS A HAZARD.

Therefore, when checking the performance of the touch control panel, put the outer cabinet on the oven to avoid touching the high voltage transformer, or unplug the primary terminal (connector) of the high voltage transformer to turn it off; the end of such connector must be insulated with an insulating tape. After servicing, be sure to replace the leads to their original locations.

A. On some models, the power supply cord between the touch control panel and the oven itself is so short that the two can't be separated.

For those models, check and repair all the controls (sensor-related ones included) of the touch control panel while keeping it connected to the oven.

B. On some models, the power supply cord between the touch control panel and the oven proper is long enough that they may be separated from each other. For those models, therefore, it is possible to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the touch control panel with a jumper, which brings about an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the touch control panel, checking them is possible if dummy resistor(s) with resistance equal to that of the controls are used.

(2) Servicing the touch control panel with power supply from an external power source:

Disconnect the touch control panel completely from the oven proper,and short both ends of the door sensing switch (on PWB) of the touch control panel,which brings about an operational state that is equivalent to the oven door being closed. Connect an external power source to the power input terminal of the touch control panel, then it is possible to check and repair the controls of the touch control panel it is also possible to check the sensor-related controls of the touch control panel by using the dummy resistor(s).

4. Servicing Tools

Tools required to service the touch control panel assembly.

1) Soldering iron: 30W
(It is recommended to use a soldering iron with a grounding terminal.)
2) Oscilloscope: Single beam, frequency range: DC - 10MHz type or more advanced model.
3) Others: Hand tools

5. Other Precautions

1) Before turning on the power source of the control unit, remove the aluminum foil applied for preventing static electricity.
2) Connect the connector of the key unit to the control unit being sure that the lead wires are not twisted.
3) After aluminum foil is removed, be careful that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
4) Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
5) Be sure to use specified components where high precision is required.

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

WARNING: Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.

1. Disconnect the oven from power supply.
2. Make sure that a definite" click" can be heard when the microwave oven door is unlatched. (Hold the door in a closed position with one hand, then push the door open button with the other, this causes the latch leads to rise, it is then possible to hear a "click' as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.
Do not operate the oven if any of the following conditions exist;
1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal or damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:
1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

Please refer to 'OVEN PARTS, CABINET PARTS, DOOR PARTS', when carrying out any of the following removal procedures:

WARNING FOR WIRING

To prevent an electric shock, take the following manners.
1. Before wiring,
   1) Disconnect the power supply.
   2) Open the door and wedge the door open.
   3) Discharge the high voltage capacitor and wait for 60 seconds.
2. Don't let the wire leads touch to the following parts;
   1) High voltage parts:
      Magnetron, High voltage transformer, High voltage capacitor and High voltage rectifier assembly.
   2) Hot parts:
      Convection heater, Oven lamp, Magnetron, High voltage transformer and Oven cavity.
   3) Sharp edge:
      Bottom plate, Oven cavity, Weveguide flange, Chassis support and other metallic plate.
   4) Movable parts (to prevent a fault)
      Fan blade, Fan motor, Switch, Switch lever, Open button, Convection motor, Convection fan, Convection fan belt,Pulley, Turntable motor, Damper motor, Damper door assembly.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector certainly until its pin is locked. And make sure that the wire leads should not come off even if the wire leads is pulled.
5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.

OUTER CASE REMOVAL

To remove the outer case, proceed as follows.
1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the screws from rear and along the side edge of case.
4. Slide the entire case back about 1 inch (3cm) to free it from retaining clips on the cavity face plate.
5. Lift the entire case from the oven.
6. Discharge the H.V. capacitor before carring out any further work.
7. Do not operate the oven with the outer case removed.

N.B.; Step1, 2 and 6 from the basis of the 3D checks.

CAUTION: DISCHARGE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.

POWER TRANSFORMER REPLACEMENT

REMOVAL
1. CARRY OUT 3D CHECKS
2. Disconnect the wire leads from power transformer
3. Disconnect the leads from magnetron filament.
4. Disconnect the leads of the power transformer from high voltage capacitor.
5. Disconnect the leads of the power transformer from high voltage wire A.
6. Remove the two (2) screws and one (1) washer holding the transformer to bottom plate.
7 .Remove the transformer.

RE-INSTALL
1. Rest the transformer on the base plate with its primary terminals toward rear cabinet.
2. Insert the two edges of the transformer into two metal tabs of the base plate.
3. Make sure the transformer is mounted correctly to the corners underneath those tabs.
4. After re-installing the transformer, secure the transformer with two screws to the base cabinet, one is with outer-tooth washer and the other is without outer-tooth washer.
5. Re-connect the wire leads (primary and high voltage) and high voltage lead to the transformer and filament

leads of transformer to the magnetron and capacitor, referring to the "Pictorial Diagram".
6. Re-install the outer case and check that the oven is operating properly.

NOTE; LIVE (ORANGE) WIRE MUST BE CONNECTED TO THE CABINET-SIDE OF THE POWER TRANSFORMER.

MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect filament lead of transformer from magnetron.
3. Disconnect high voltage wire lead from magnetron.
4. Remove the cooling fan assembly refer to "Cooling Fan Removal"
5. Carefully remove four (4) mounting screws holding the magnetron and magnetron air guide to waveguide. When removing the screws hold the magnetron and magnetron air guide to prevent it from falling.
6. Remove the magnetron from the waveguide with care so the magnetron antenna should not hit by any metal object around the antenna

CAUTION: WHEN REPLACING THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS ARE TIGHTENED SECURELY.

HIGH VOLTAGE COMPONENTS REMOVAL (High Voltage Capacitor and High Voltage Rectifier Assembly)

To remove the components, proceed as follows.
1. CARRY OUT 3D CHECKS.
2. Remove one (1) screw holding capacitor holder to rear cabinet.
3. Remove one (1) screw holding earth side terminal of high voltage rectifier assembly, and remove capacitor holder.
4. Disconnect all the leads and terminals of high voltage rectifier assembly from high voltage capacitor.
5. Now, high voltage rectifier assembly and high voltage capacitor should be free.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER ASSEMBLY, ENSURE THAT THE CATHODE (EARTH) CONNECTION IS SECURELY FIXED TO THE CAPACITOR HOLDER WITH AN EARTHING SCREW.

OVEN LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS.
2. Pull the wire leads from the oven lamp socket by pushing the terminal hole of the oven lamp socket with the flat type small screw driver.
3. Lift up the tab of oven lamp mounting plate holding the oven lamp socket.
4. Slide the oven lamp socket left-ward.
5. Now, the oven lamp socket is free.

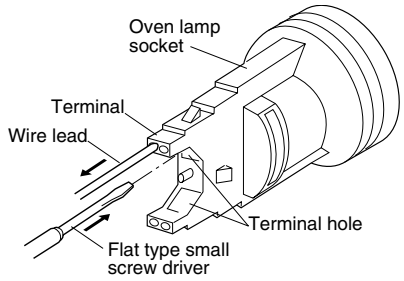


Figure C-1 Oven lamp socket

POSITIVE LOCK® CONNECTOR REMOVAL

Pushing the lever of positive lock® connector
Pull out the positive lock® connector

CAUTION: WHEN YOU (SERVICE ENGINEERS) CONNECT THE POSITIVE LOCK® CONNECTORS TO THE TERMINALS, CONNECT THE POSITIVE LOCK® SO THAT THE LEVER FACE YOU (SERVICE ENGINEERS).

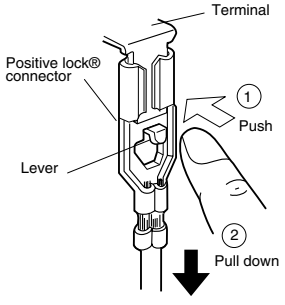


Figure C-2 Positive lock® connector

CONTROL PANEL ASSEMBLY AND CONTROL UNIT REMOVAL

To remove the control panel, proceed as follows:
1. CARRY OUT 3D CHECKS.
2. Disconnect connector CN-A, CN-E, CN-B, CN-F, TAB1, TAB2 and TAB3 from the control unit.
3. Remove one (1) screw holding the control panel to the panel back angle.
4. Lift up and pull the control panel forward.

Replacement of individual component is as follows:

CONTROL UNIT AND KEY UNIT
5. Disconnect the wire connector from the control unit.
6. Remove the three (3) screws holding the control unit to the panel frame.
7. Lift up the control unit and disconnect the key connector from the control unit.
8. Now, the control unit and frame assembly are separated.

NOTE: 1. Before attaching a new key unit, remove remaining adhesive on the control panel frame surfaces completely with a soft cloth soaked in alcohol.
2. When attaching the key unit to the control panel frame, adjust the upper edge and right edge of the key unit to the correct position of control panel frame.
3. Stick the key unit firmly to the control panel frame by rubbing with soft cloth not to scratch.

TURNTABLE MOTOR REMOVAL

1. Disconnect the oven from power supply.
2. Remove one (1) screw holding the turntable motor cover to the base plate and take off the turntable motor cover.
3. Disconnect wire lead from the turntable motor.
4. Remove the two (2) screws holding the turntable motor to the mounting plate of the weight sensor assembly.
6. Turntable motor will be free.

CONVECTION MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from the convection motor. Remove the convection fan belt and pulley(M).
3. Remove two (2) screws holding the convection motor mounting angle to the heater duct and base cabinet.
4. Take out the convection motor assembly from the unit. The convection motor assembly is now free.
5. Remove two (2) screws and nuts holding the motor to mounting angle.
6. Convection motor is now free.

DAMPER ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove cooling fan duct refer to "Cooling Fan Motor Removal"
3. Disconnect wire leads from damper motor and damper switch.
4. Remove two (2) screws holding damper motor angle to thermal protection plate (right).
5. Damper assembly is free.
6. Remove one (1) screw holding damper motor to damper motor angle and one (1) screw holding damper switch to damper motor angle.
7. Damper motor and switch are free.

COOLING FAN MOTOR WITH FAN THERMAL CUT-OUT REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from the cooling fan motor and fan thermal cut-out.
3. Release the main harness from the hang and hole of the fan duct. And release.
4. Release the snap band tab of the main harness from the chassis support.
5. Remove three (3) screws holding the chassis support to rear cabinet, control panel back plate and wave guide.
6. Release one (1) tab holding cooling fan duct to air guide.
7. Remove cooling duct and fan motor assembly from unit.
   The cooling fan motor assembly is now free.
8. Remove fan blade from fan motor shaft by pulling fan retainer clip.
9. Remove two (2) screws and nuts holding cooling fan motor and fan thermal cut-out mounting plate. The cooling fan motor is now free.
10. Remove the two (2) screws holding the fan thermal cut-out to the mounting plate. Now the fan thermal cut-out is free.

CONVECTION MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Release the door spring (left) from the door cam (left) and the base plate.
3. Remove one (1) screw holding the insulator to base plate.
4. Remove the insulator from the base plate.
5. Disconnect wire leads from the convection motor.
   Remove the convection fan belt and pulley(M).
6. Remove two (2) screws holding the convection motor mounting angle to the heater duct and base cabinet.
7. Take out the convection motor assembly from the unit. The convection motor assembly is now free.
8. Remove two (2) screws and nuts holding the motor to mounting angle.
9. Convection motor is now free.

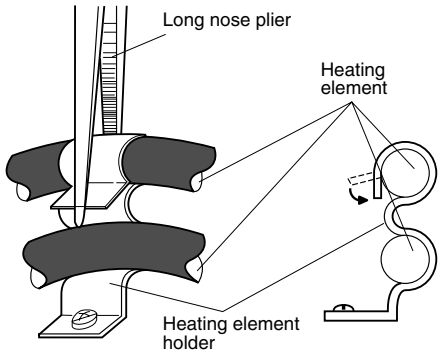
WEIGHT SENSOR ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the turntable motor, referring to "TURNTABLE MOTOR REMOVAL".
3. Remove the four (4) screws holding the weight sensor assembly to the base plate.
4. Remove the four (4) screws holding the weight sensor assembly to the oven cavity.
5. Disconnect the connector from the weight sensor assembly.
6. Remove the turntable gear A from the weight sensor assembly.
7. Now, the weight sensor assembly is free.

HEATER UNIT ASSEMBLY REMOVAL (HEATING ELEMENT/THERMISTOR)

1. CARRY OUT 3D CHECKS.
2. Remove convection motor assembly refer to "Convection Motor Removal".
.3 Disconnect wire leads from oven thermal cut-out and heater element.
4. Remove two (2) screws holding the thermistor assembly to the heater duct assembly.
.5 Disconnect wire leads from thermistor assembly. Now, thermistor assembly is free.
6. Release two (2) snap bands from the holes holding wire harness to the thermal protection plate (left).
7. Remove eleven (11) screws (3 screws from outside and 8 screws from inside) holding heater duct to the oven cavity.
8. The heater unit assembly is now free.
9. Remove one (1) nut and one (1) washer holding the convection fan to the bearing assembly.
10. Remove convection fan from the bearing assembly.
11. Remove two (2) screws holding the bearing mounting plate to the heater duct assembly.
12. Remove three (3) screws holding the thermal protection plate (left) to the heater duct assembly.
13. Remove the thermal protection plate (left) and thermal protection sheet (left) from the heater duct assembly.
14. Remove two (2) screws holding the convection heater to the heater duct assembly.
15. Remove two (2) screws holding the two heater elements holder to the heater duct assembly.
16. Remove two heater elements holders from the convection heater.
17. Now, the convection heater is free.

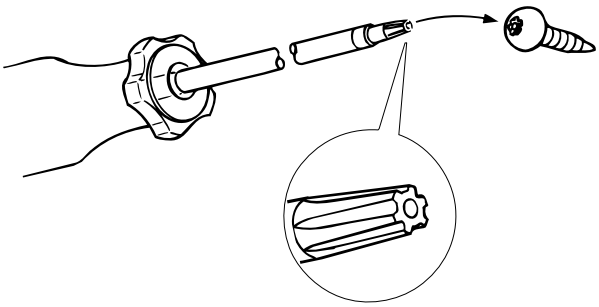
NOTE: After installed the heater element completely, bent top of the heater element holder to inside using by long nose plier as shown following illustration.



CORD HOLDER REMOVAL

1. Remove the one (1) special screw holding the cord holder to the rear cabinet, using the special driver LHSTIX DLR4-100T.
2. Now, the cord holder is free.

NOTE: When securing or loosening the special screw, LHSTIX DLR4-100T type screw driver should be used.



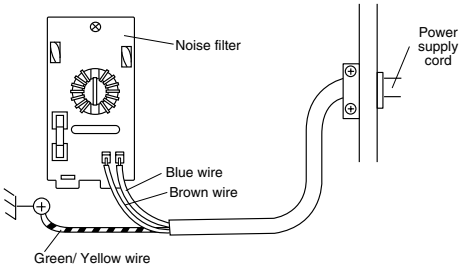
POWER SUPPLY CORD REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Disconnect the brown and blue wire leads of the power supply cord from the noise filter.
3. Remove the single (1) screw holding the green/yellow wire lead to the base plate.
4. Remove the two (2) screws holding the cord anchorages upper and lower to the base plate.
5. Pull out the power supply cord from the hole in the rear cabinet.
6. Now, the power supply cord is free.

Re-install

1. Insert the power supply cord into the hole of the rear cabinet.
2. Hold the power supply cord to the bottom plate by fixing the cord anchorage upper and lower with the two (2) screws.
3. Earth the green/yellow wire lead of the power supply cord to the bottom plate with the single (1) screw.
4. Connect the brown and blue wire leads of the power supply to the noise filter referring to the Pictorial Diagram.
5. CARRY OUT 4R CHECKS.



RIGHT AND LEFT LATCH SWITCHES, STOP SWITCH AND MONITOR SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the switches.
3. Keep pushing the stopper tub(s) holding the switch to the latch hook.
4 Revolve the switch on the pole.
5. Remove the switch from the latch hook.

CAUTION: WHEN REMOVING THE SWITCHES, DON'T BREAK THE STOPPER TAB(S) OF THE LATCH HOOK.

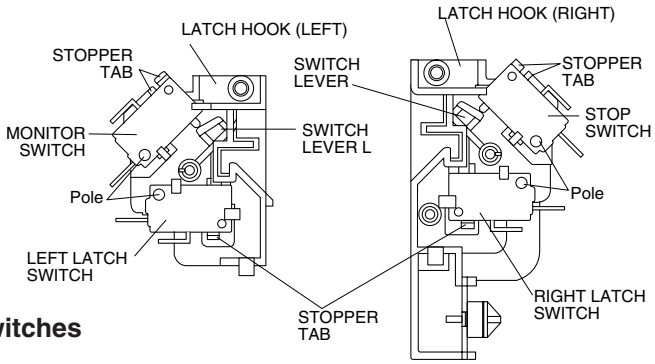


Figure C-3. Switches

RIGHT AND LEFT LATCH SWITCHES, STOP SWITCH AND MONITOR SWITCH ADJUSTMENT

If the right latch switch, left latch switch, stop switch and monitor switch do not operate properly due to a mis-adjustment, the following adjustment should be made.

1. CARRY OUT 3D CHECKS.
2. Remove the outer frame assembly referring to "Outer Frame Assembly Removal".
3. Loosen the one (1) screw holding the latch hook to the oven cavity face plate for each of right and left side.
4. Adjustment the both latch hooks by moving it back and forward or up and down. No door play allow with tight fit on the door closed position.
5. Secure the screws with washers firmly.
6. Make sure of the right latch, left latch, stop and monitor switches operation. If the switches do not activated with the door closed completely, repeat above procedure.

After the adjustment, make sure of the following:

1. The monitor switch contacts close when the door is opened.
2. The contact of right latch, left latch and stop switches open within 1.2mm gap between upper side of cavity face plate and door when door is open.
3. Re-install the outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement.)

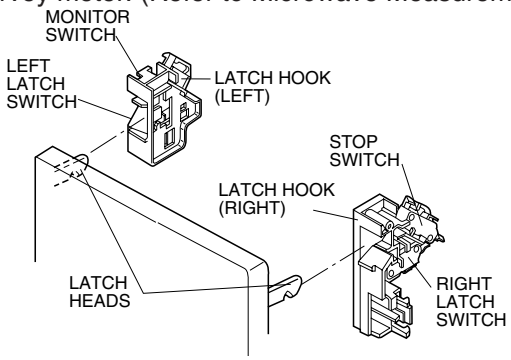
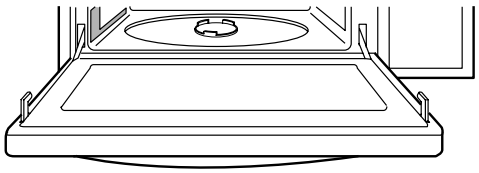
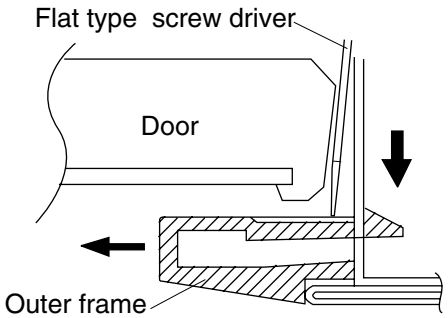


Figure C-4. Latch Switch Adjustment.

OUTER FRAME ASSEMBLY REMOVAL

1. Remove the five (5) screws.
2. Open the door , push the two hooks of lower frame by using flat type screw driver and pull the sash to front side.
3. Remove other hooks of top, right and left side and then the outer frame assembly can be removed.





DOOR REPLACEMENT AND ADJUSTMENT

DOOR REPLACEMENT

1. CARRY OUT 3D CHECKS.
2. Remove turntable tray and turntable support from oven cavity.
3. Remove the outer frame assembly, referring to "Outer Frame Assembly Removal".
4. Remove the door cam spring and door cam from the base plate.
5. Loosen three (3) screws on the right oven hinge, remove the three (3) screws holding the left hinge and remove the door assembly.
6. Door assembly is now free.

NOTE: When individual parts are replaced, refer to "Door Disassembly".

7. On re-installing door, insert the right oven hinge into the door hinge pin.
8. Then while holding door in place. Make sure door is parallel with oven face lines (left and upper side lines) and the door latch heads pass through the latch holes correctly.
9. Insert the left oven hinge to the base plate and the door hinge pin.
10. Then secure the right and left hinges firmly with the six (6) mounting screws. Then secure the outer frame sash.

NOTE: After any service to the door;
Make sure that the right latch, left latch, stop and monitor switches are operating properly. (Refer to chapter "Test Procedures".)

11.CARRY OUT 4R CHECKS.

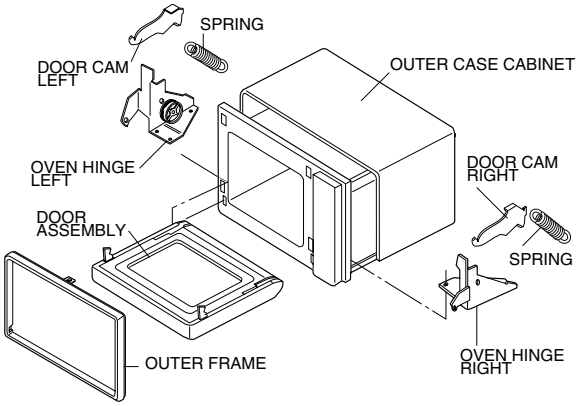
NOTE: After any service to the door;
An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards. (Refer to Microwave Measurement.)

DOOR ADJUSTMENT

The door is adjusted by keeping the screws of each hinge loose.

After adjustment, make sure of the following :

1. Door latch heads smoothly catch the latch hook through the latch holes, and the latch head goes through the centre of the latch hole.
2. Deviation of the door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. The door is positioned with its face depressed toward the cavity face plate.
4. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement .)



DOOR PARTS DISASSEMBLY

Remove door assembly, refer to "Door Replacement".
Replacement of door components are as follows:

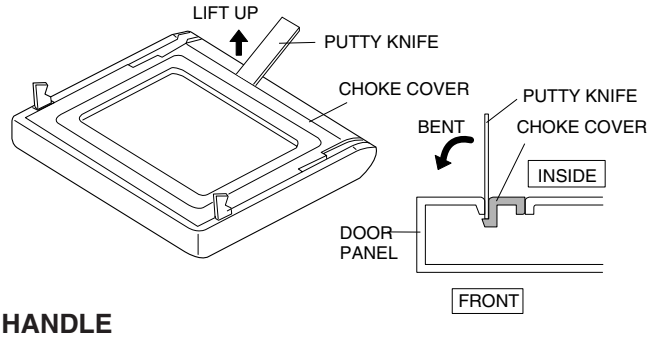
1. Place door assembly on a soft cloth with latches facing up.

NOTE: As the engaging part of choke cover and door panel are provided at 16 places, do not force any particular part.

CHOKE COVER

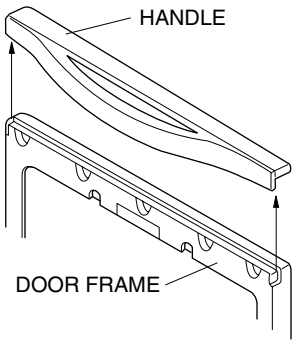
2. Insert an iron plate (thickness of about 0.5mm) into the gap between the choke cover and the door panel as shown figure to free engaging parts.
3. Lift up choke cover.
4. Now choke cover is free from door panel.

NOTE: When carrying out any repair to the door, do not bend or warp the slit choke (tabs on the door panel assembly) to prevent microwave leakage.



HANDLE

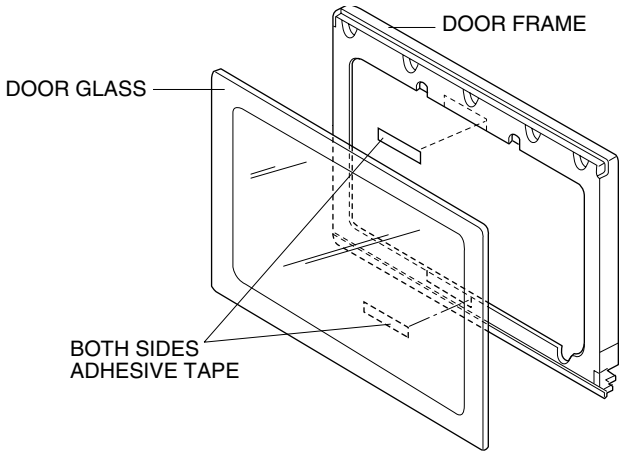
5. Remove the five (5) screws holding the handle to the door panel.
6. Pull out the handle from the door frame.
7. Now, the handle is free.



DOOR GLASS

8. Pull out the door glass from the door frame.
9. Now, the door glass is free.

Note: When the new door glass is installed, attach the two both sides adhesive tapes on the upper and lower portion of the door frame front surface. The both side adhesive tape should be used size of 5mm x 50mm and thickness of 0.4mm ~ 0.8mm.



DOOR FRAME

10. Remove the five (5) screws holding the door frame to the door panel.
11. Release the two (2) tabs of the door frame holding the door frame to the door panel.
12. Now, the door frame is free.

LATCH HEADS

13. Release the one (1) spring from the tab of the door panel at the left and right sides.
14. Remove each one (1) screw holding the latch head to the door panel at the left and right sides.
15. Remove the latch head with spring from the door panel at the left and right sides.
16. Release the spring from the latch head at the left and right sides.
17. Now, the latch heads are free.
18. And, the door panel is free.

MICROWAVE MEASUREMENT

After adjustment of door latch switches, monitor switch and door are completed individually or collectively, the following leakage test must be performed with a survey instrument and it must be confirmed that the result meets the requirements of the performance standard for microwave oven.

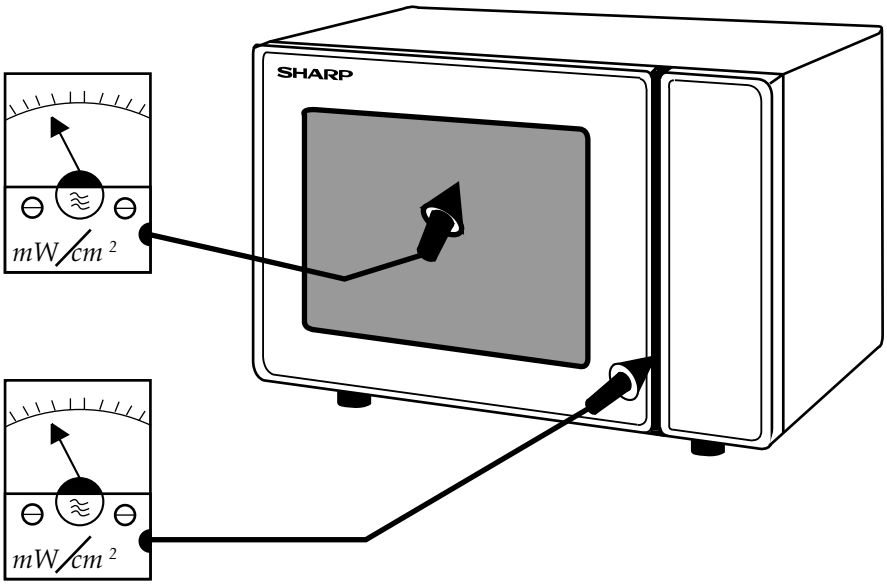
REQUIREMENT

The safety switch must prevent microwave radiation emission in excess of 5mW/cm2 at any point 5cm or more from external surface of the oven.

PREPARATION FOR TESTING:

Before beginning the actual test for leakage, proceed as follows;

1. Make sure that the test instrument is operating normally as specified in its instruction booklet.
   Important:
   Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing.
   Recommended instruments are:
   NARDA 8100
   NARDA 8200
   HOLADAY HI 1500
   SIMPSON 380M
2. Place the oven tray into the oven cavity.
3. Place the load of 275 ± 15ml of water initially at 20 ± 5˚C in the centre of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive material such as glass or plastic.
   The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of cool water.
5. Move the probe slowly (not faster that 2.5cm/sec.) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.



Microwave leakage measurement at 5 cm distance

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. CLOCK APPERARS ON DISPLAY

NOTE: ★indicates components with potential above 250V.

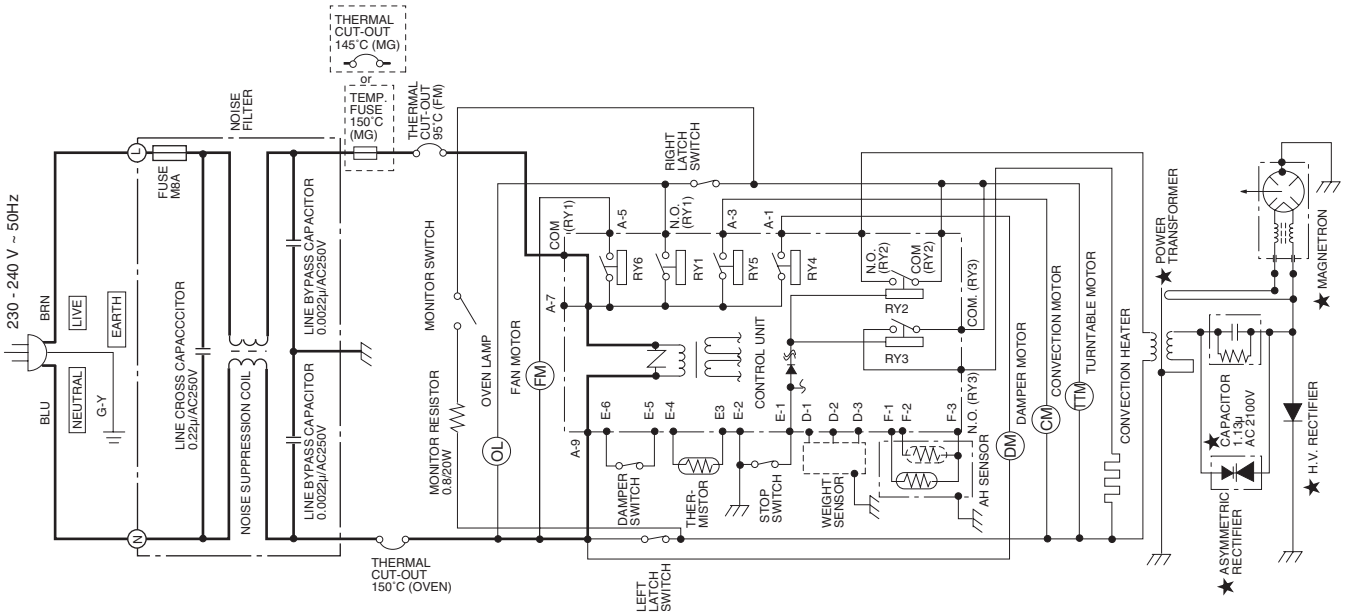


Figure O-1. Oven Schematic-OFF Condition

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. COOKING TIME PROGRAMMED.
3.VARIABLE COOKING CONTROL “HIGH”
4. START PAD TOUCHED.

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. “DEFROST SENSOR” PAD TOUCHED.
3. START PAD TOUCHED.

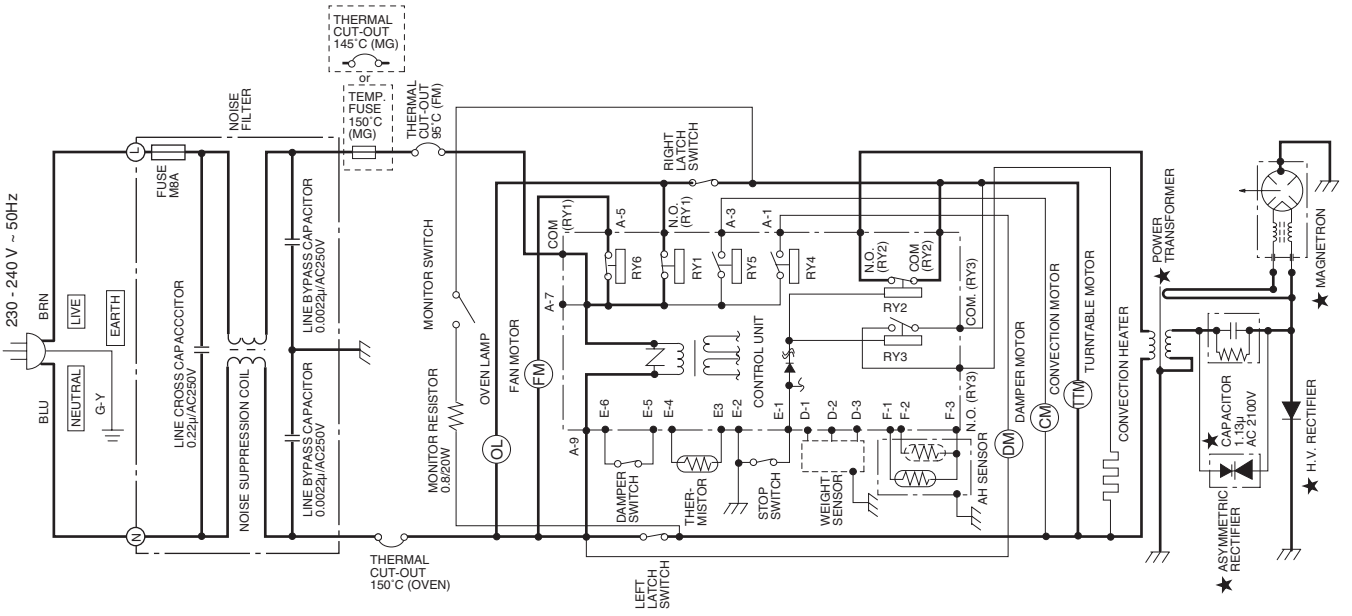


Figure O-2. Oven Schematic-High or Easy Defrost or Reheat Sensor Cooking Condition

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.
2. CONVECTION PAD TOUCHED.
3.DESIRED TEMO. PAD TOUCHED.
4. START PAD TOUCHED.

NOTE: ★ indicates components with potential above 250V.

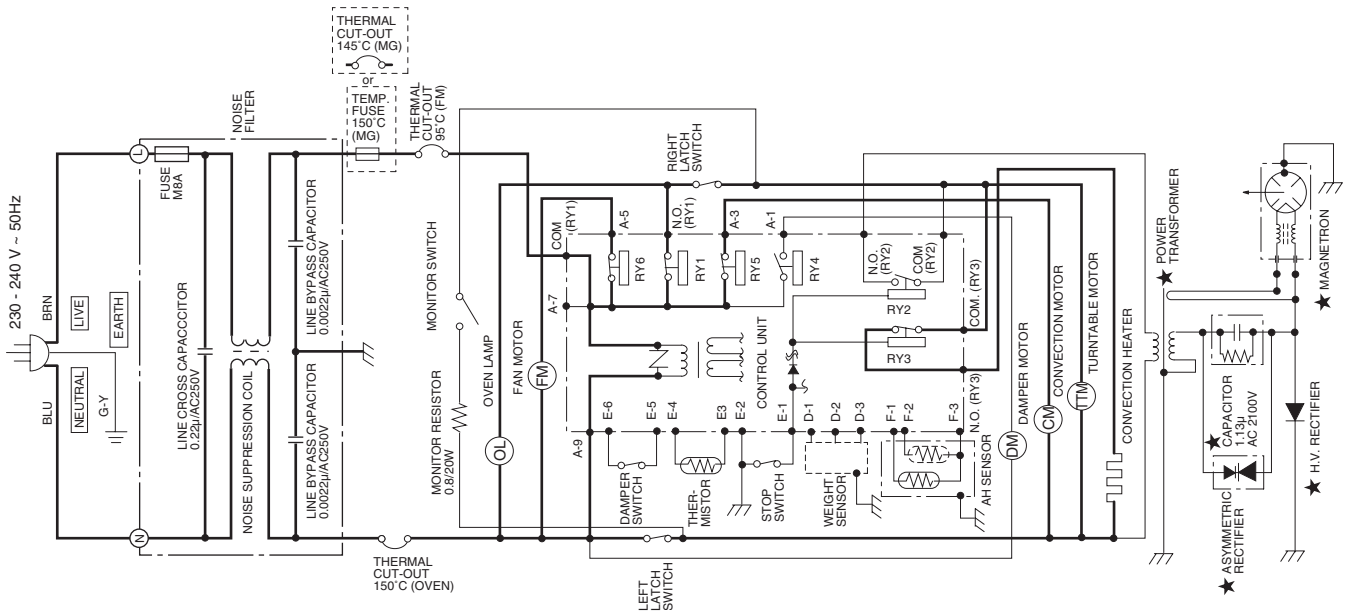


Figure O-3. Oven Schematic-Convection Cooking Condition

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.
2. MIX COOKING PAD TOUCHED.
3.DESIRED TEMP. PAD TOUCHED.
4. START PAD TOUCHED.

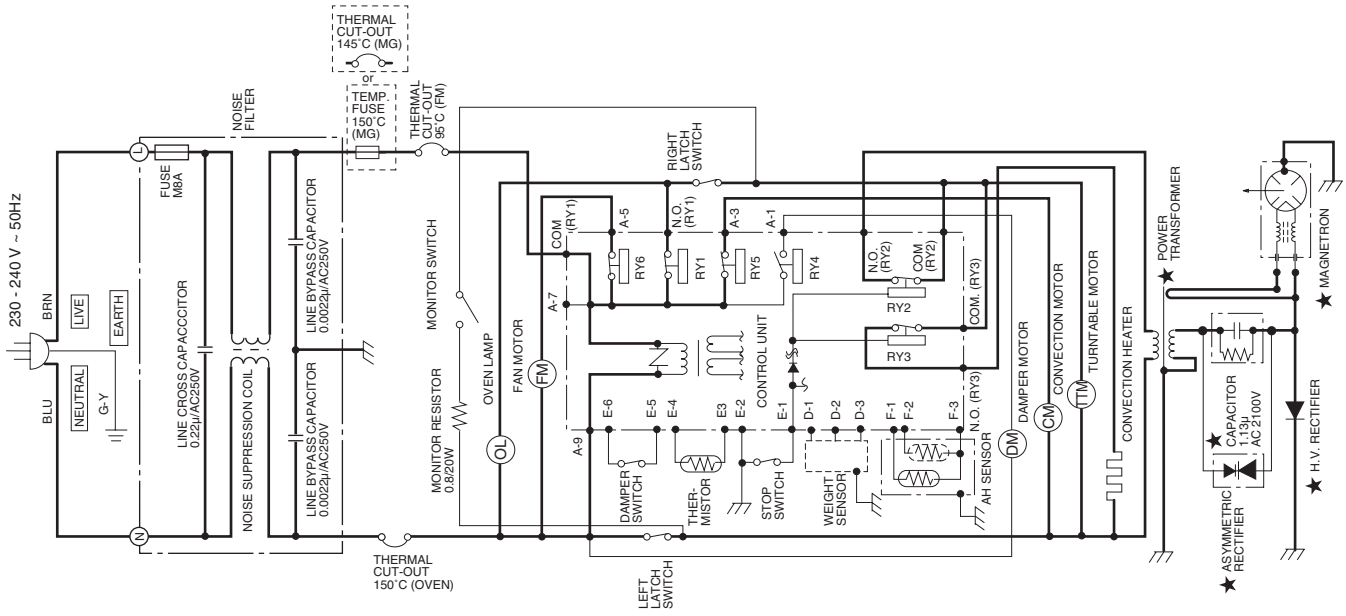


Figure O-4. Oven Schematic-Automatic Mix Cooking Condition

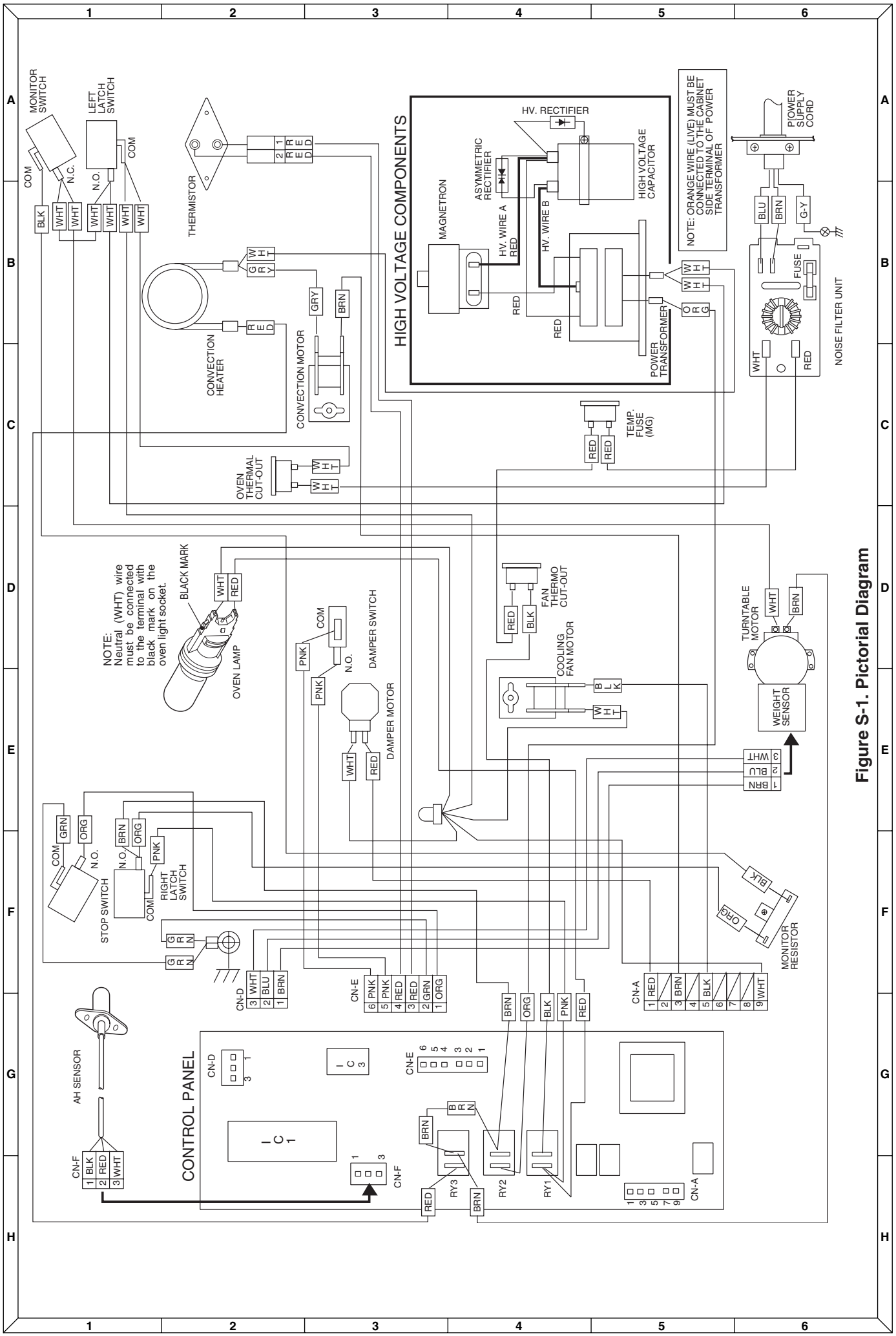


Figure S-1. Pictorial Diagram

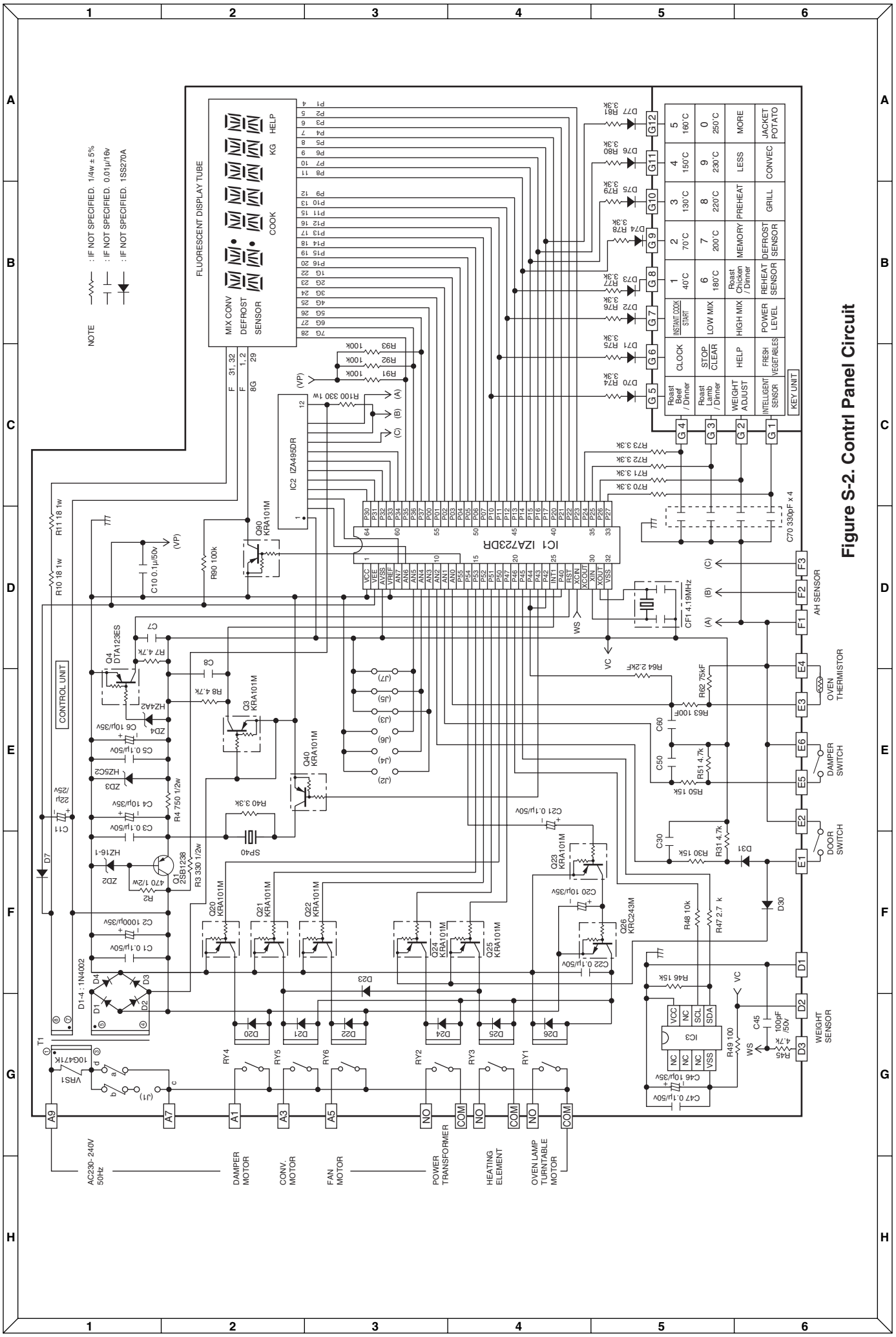


Figure S-2. Contrl Panel Circuit

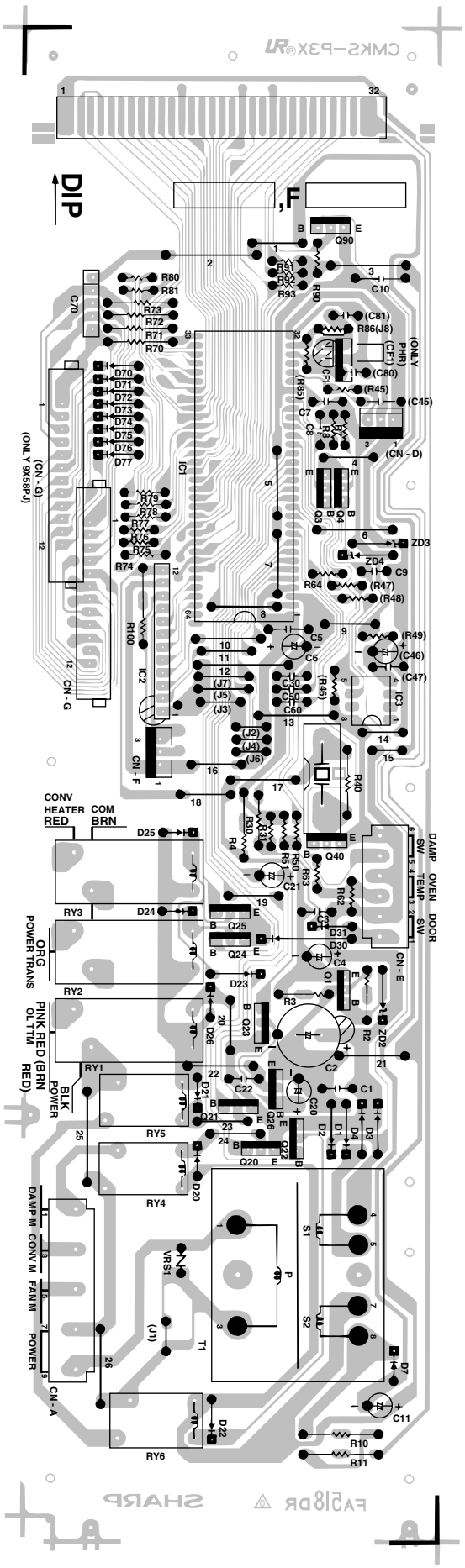


Figure S-3. Printed Wiring Board

PARTS LIST

Note: The parts marked "Δ" may cause undue microwave exposure.
The parts marked "*" are used in voltage more than 250V.

	REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
			ELECTRICAL PARTS		
*	1- 1	FH-DZA058WRK0	High voltage rectifier assembly	1	AL
	1- 2	FH-HZA041WRE0	Thermistor assembly	1	AN
	1- 3	QACC-A143WRZZ	Power supply cord	1	AR
	1- 4	QFS-CA010WRE0	Fuse (M8A)	1	AE
	1- 5	QFS-TA013WRE0	Temp. fuse 150deg.C(MG)	1	AG
	1- 5	RTHM-A080WRE0	Thermal cut-out 145deg.C(MG)(Interchangeable)	1	AP
	1- 5	RTHM-A112WRE0	Thermal cut-out 145deg.C(MG)(Interchangeable)	1	AG
	1- 5	RTHM-A120WRE0	Thermal cut-out 145deg.C(MG)(Interchangeable)	1	AH
	1- 6	FPWBFA311WRK0	Noise filter	1	AT
	1- 7	QSOCLA024WRE0	Oven lamp socket	1	AG
	1- 8	QSW-MA072WRE0	Monitor switch	1	AF
	1- 9	QSW-MA085WRE0	Damper switch	1	AF
	1- 9	QSW-MA131WRE0	Damper switch(Interchangeable)	1	AG
	1-10	QSW-MA085WRE0	Left latch switch/Right latch switch	2	AF
	1-10	QSW-MA131WRE0	Left latch switch/Right latch switch(Interchangeable)	2	AG
*	1-11	RC-QZA229WRE0	High voltage capacitor	1	AU
*	1-11	RC-QZA292WRZZ	High voltage capacitor(Interchangeable) for production use	1	--
	1-12	RHET-A139WRE0	Convection heater	1	AY
	1-13	RLMPTA069WRE0	Oven lamp	1	AK
	1-13	RLMPTA029WRE0	Oven lamp (Interchangeable)	1	AL
	1-13	RLMPTA033WRE0	Oven lamp (Interchangeable)	1	AK
	1-13	RLMPTA078WRE0	Oven lamp (Interchangeable)	1	AL
	1-14	RMOTDA191WRE0	Damper motor	1	AS
	1-15	DANGKA072WRK0	Weight sensor assembly	1	BA
	1-16	RMOTEA303WRE0	Cooling fan motor	1	AX
	1-17	RMOTEA284WRE0	Convection motor	1	AZ
	1-18	RR-WZA022WRE0	Monitor resistor 0.8ohm 20W	1	AK
	1-19	QSW-MA070WRE0	Stop switch	1	AF
	1-20	RTHM-A079WRE0	Thermal cut-out 95deg.C(Fan)	1	AL
	1-20	RTHM-A117WRE0	Thermal cut-out 95deg.C(Fan)(Interchangeable)	1	AK
	1-20	RTHM-A111WRE0	" " (Fan)(Interchangeable)for production use	1	--
*	1-21	RTRN-A501WRE0	Power transformer	1	BR
Δ*	1-22	RV-MZA222WRE0	Magnetron	1	BN
	1-23	FDTCTA170WRK0	AH sensor assembly	1	AV
	1-24	RTHM-A121WRE0	Oven thermal cut-out 150deg.C	1	AK
	1-24	RTHM-A085WRE0	Oven thermal cut-out 150deg.C(Interchangeable)	1	AL
	1-24	RTHM-A099WRE0	" " " 150deg.C(Interchangeable)for production use	1	--
	1-25	NGERHA077WRF0	Turntable gear A	1	AC
	1-26	RMOTDA173WRE0	Turntable motor	1	AX
	1-26	RMOTDA253WRZZ	Turntable motor(Interchangeable)	1	AV
			CABINET PARTS		
	2- 1	GCABUA721WRP0	Outer case cabinet	1	BF
	2- 2	GFTARA001WRW0	Oven lamp access cover	1	AC
	2- 3	FDAI-A201WRY0	Base plate	1	BB
	2- 4	GLEGPA056WRE0	Foot	4	AD
	2- 5	GCABDA074WRW0	Rear cabinet	1	AG
	2- 6	GCOVHA280WRP0	Turntable motor cover	1	AC
	2- 7	LBNDKA036WRP0	Capacitor holder	1	AG
	2- 8	FHNG-A205WRY0	Oven hinge assembly (Left)	1	AS
	2- 9	FHNG-A206WRY0	Oven hinge assembly (Right)	1	AR
	2-10	PHOK-A079WRF0	Latch hook (Right)	1	AF
	2-11	MLEVPA213WRF0	Switch lever	1	AK
	2-12	PHOK-A080WRF0	Latch hook (Left)	1	AE
	2-13	LSTPPA141WRF0	Cord anchorage (Upper)	1	AD
	2-14	LSTPP0009YBF0	Cord anchorage (Lower)	1	AC
	2-15	LBSHC0032WRE0	Cord bushing	1	AB
	2-16	MLEVPA214WRF0	Switch lever L	1	AE
			CONTROL PANEL PARTS		
	3- 1	DPWBFB575WRU0	Control unit (New Zealand only)	1	BR
	3- 1A	QCNCMA227DRE0	5-pin connector(A)	1	AC
	3- 1B	QCNCMA039DRE0	3-pin connector(D)	1	AB
	3- 1C	QCNCMA267DRE0	6-pin connector(E)	1	AC
	3- 1D	QCNCMA237DRE0	3-pin connector(F)	1	AD
	3- 1E	QCNCWA057DRE0	12-pin connector(G)	1	AF
	3- 1F	RV-KXA077DRE0	Fluorescent display tube	1	AY
	3- 1G	PCUSGA381WRP0	Cushion	2	AG
	C1	RC-KZA087DRE0	Capacitor 0.1μF 50V	1	AB
	C2	VCEAB31VW108M	Capacitor 1000μF 35V	1	AF
	C3	RC-KZA087DRE0	Capacitor 0.1μF 50V	1	AB

Note: The parts marked "Δ" may cause undue microwave exposure.
The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
C4	VCEAB31VW106M	Capacitor 10µF 35V	1	AA
C5	RC-KZA087DRE0	Capacitor 0.1µF 50V	1	AB
C6	VCEAB31VW106M	Capacitor 10µF 35V	1	AA
C7-8	VCKYD11CY103N	Capacitor 0.01µF 16V	2	AH
C9	VCTYF31HF103Z	Capacitor 0.01µF 50V	1	AB
C10	RC-KZA087DRE0	Capacitor 0.1µF 50V	1	AB
C11	VCEAB31EW226M	Capacitor 22µF 25V	1	AA
C20	VCEAB31VW106M	Capacitor 10µF 35V	1	AA
C21	VCEAB31HW104M	Capacitor 0.1µF 50V	1	AM
C22	RC-KZA087DRE0	Capacitor 0.1µF 50V	1	AB
C30	VCKYD11CY103N	Capacitor 0.01µF 16V	1	AH
C45	VCKYD11HB101K	Capacitor 100pF 50V	1	AA
C46	VCEAB31VW106M	Capacitor 10µF 35V	1	AA
C47	RC-KZA087DRE0	Capacitor 0.1µF 50V	1	AB
C50	VCKYD11CY103N	Capacitor 0.01µF 16V	1	AH
C60	VCKYD11CY103N	Capacitor 0.01µF 16V	1	AH
C70	RMPTEA009DRE0	Capacitor array 330pF x 4	1	AE
CF1	RCRS-A035DRE0	Ceramic resonator (CST4.19MGW)	1	AG
D1-4	RH-DZA006PRE0	Diode (1N4002)	4	AD
D7	VHD1SS270A/-1	Diode (1SS270ATA)	1	AA
D20-26	VHD1SS270A/-1	Diode (1SS270ATA)	7	AA
D30-31	VHD1SS270A/-1	Diode (1SS270ATA)	2	AA
D70-77	VHD1SS270A/-1	Diode (1SS270ATA)	8	AA
IC1	RH-IZA723DRE0	LSI	1	AX
IC2	RH-IZA495DRE0	IC	1	AL
IC3	RH-IZA979DRE0	IC	1	AN
Q1	VS2SB1238//-3	Transistor (2SB1238)	1	AA
Q3	VSKRA101M//-3	Transistor (KRA101M)	1	AB
Q4	VSDTA123ES/-3	Transistor (DTA123E)	1	AA
Q20-23	VSKRA101M//-3	Transistor (KRA101M)	4	AB
Q24-25	VSKRA223M//-3	Transistor (KRA223M)	2	AB
Q26	VSKRC243M//-3	Transistor (KRC243M)	1	AB
Q40	VSKRA101M//-3	Transistor (KRA101M)	1	AB
Q90	VSKRA101M//-3	Transistor (KRA101M)	1	AB
R2	VRD-B12HF471J	Resistor 470 ohm 1/2W	1	AA
R3	VRD-B12HF331J	Resistor 330 ohm 1/2W	1	AA
R4	VRD-B12HF751J	Resistor 750 ohm 1/2W	1	AA
R7-8	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	2	AA
R10-11	VRS-B13AA180J	Resistor 18 ohm 1W	2	AA
R30	VRD-B12EF153J	Resistor 15k ohm 1/4W	1	AA
R31	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
R40	VRD-B12EF332J	Resistor 3.3k ohm 1/4W	1	AA
R45	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
R46	VRD-B12EF153J	Resistor 15k ohm 1/4W	1	AA
R47	VRD-B12EF272J	Resistor 2.7k ohm 1/4W	1	AA
R48	VRD-B12EF103J	Resistor 10k ohm 1/4W	1	AA
R49	VRD-B12EF101J	Resistor 100 ohm 1/4W	1	AA
R50	VRD-B12EF153J	Resistor 15k ohm 1/4W	1	AA
R51	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
R62	VRN-B12EK753F	Resistor 75k ohm(F) 1/4W	1	AA
R63	VRN-B12EK101F	Resistor 100 ohm(F) 1/4W	1	AA
R64	VRN-B12EK222F	Resistor 2.2k ohm(F) 1/4W	1	AA
R70-81	VRD-B12EF332J	Resistor 3.3k ohm 1/4W	12	AA
R90-93	VRD-B12EF104J	Resistor 100k ohm 1/4W	4	AA
R100	VRS-B13AA331J	Resistor 330 ohm 1W	1	AA
RY1-3	RRLY-A083DRE0	Relay (OMIF-S-118LM)	3	AK
RY4-6	RRLY-A078DRE0	Relay (OJ-SS-118LM)	3	AG
SP40	RALM-A014DRE0	Buzzer (PKM22EPT)	1	AG
T1	RTRNPA089DRE0	Transformer	1	AU
VRS1	RH-VZA032DRE0	Varistor (10G471K)	1	AE
ZD2	VHEHZ161///-1	Zener diode (HZ16-1)	1	AA
ZD3	VHEHZ5C2///-1	Zener diode (HZ5C-2)	1	AA
ZD4	VHEHZ4A2///-1	Zener diode (HZ4A2)	1	AA
3- 2	FPNLCB833WRKZ	Control panel frame with key unit	1	BD
3- 2-1	FUNTKB157WREZ	Key unit	1	BA
3- 3	XEPSD30P10XS0	Screw ; control unit mtg.	3	AA

OVEN PARTS

Δ	4- 1	FOVN-A321WRY0	Oven cavity assembly	1	AW
	4- 2	FSRAHA047WRY0	Turntable support	1	BA
	4- 3	NTNT-A019WRH0	Turntable tray	1	AT
	4- 4	FBRGMA002WRE0	Bearing assembly	1	AQ
	4- 5	PREFHA028WRW0	Thermal protection plate (left)	1	AS
	4- 6	LANGTA196WRW0	Bearing mounting plate	1	AD
	4- 7	LBNDK0054WRE0	Heater element holder	2	AB

Note: The parts marked "Δ" may cause undue microwave exposure.
The parts marked "*" are used in voltage more than 250V.

	REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
	4- 8	LFIX-A013WRW0	Bearing holder plate	1	AB
	4- 9	NFANMA019WRW0	Convection fan	1	AE
	4-10	NPLYBA025WRF0	Pulley	2	AC
	4-11	FDUC-A279WRK0	Heater duct assembly	1	AT
	4-12	PFPF-A138WRE0	Thermal protection sheet (left)	1	AK
	4-13	PCUSUA186WRP0	Cushion	1	AC
	4-14	PCOVQA017WRP0	L-hook cover	1	AB
	4-15	PCOVWA012WRF0	Insulator	1	AG
	4-16	FDUC-A316WRW0	Steam duct assembly	1	BB
	4-17	MCAMPA030WRF0	Damper cam	1	AC
	4-18	NSFTTA114WRE0	Damper shaft	1	AB
	4-19	FFTA-A034WRK0	Damper assembly	1	AM
	4-20	PDUC-A269WRW0	Damper duct	1	AK
	4-21	PCUSGA410WRP0	cushion	1	AD
	4-22	PSKR-A266WRW0	Separate angle	1	AC
	4-23	PCOVPA301WRE0	Waveguide cover	1	AE
	4-24	PCUSUA197WRP0	Steam cushion C	2	AD
	4-25	LHLDKA009WRF0	Cord holder	1	AD
	4-26	PFPF-A139WRE0	Thermal protection sheet (right)	1	AF
	4-27	PREFHA053WRW0	Thermal protection plate (Right)	1	AP
	4-28	PSKR-A250WRP0	Air guide (bottom)	1	AK
	4-29	PSKR-A161WRW0	Air guide (right)	1	AF
	4-30	LANGQA407WRW0	Convection motor mounting plate	1	AG
	4-31	PCUSUA167WRP0	Cushion	2	AF
	4-32	NFANJA020WRE0	Cooling fan	1	AE
	4-33	PDUC-A270WRF0	Cooling fan duct	1	AL
	4-34	LANGFA089WRW0	Chassis support	1	AE
	4-35	PCUSUA424WRP0	Cushion	1	AG
	4-36	NBLTKA005WRE0	Convection fan belt	1	AF
	4-37	LANGQA065WRP0	Noise unit angle	1	AD
	4-38	PCUSUA196WRP0	Cushion	2	AD
	4-39	PCUSUA425WRP0	Damper duct cushion	1	AG
	4-40	PCUSGA236WRP0	Cushion	1	AC
	4-41	GWAKPA261WRF0	Frame	1	AV
	4-42	MCAMPA064WRM0	Door cam (Right)	1	AE
	4-43	MCAMPA065WRM0	Door cam (Left)	1	AE
	4-44	MSPRTA161WRE0	Door spring (Right)	1	AF
	4-45	MSPRTA162WRE0	Door spring (Left)	1	AG
	4-46	PSKR-A171WRW0	Magnetron air guide	1	AF
	4-47	LANGTA289WRW0	Panel back angle	1	AK
	4-48	LANGQA213WRW0	Lamp socket mounting angle	1	AE
	4-49	PFPF-A064WRE0	Thermal protection sheet	1	AF
	4-50	PGLSPA485WRE0	Oven lamp screen	1	AF
	4-51	FANGKA196WRY0	Turntable motor mounting angle	1	AH
	4-52	LANGQA369WRP0	Thermal cut-out mounting angle	1	AB
	4-53	PCUSUA173WRP0	Cushion	1	AC
Δ	4-54	PSHE-A095WREZ	Alumium tape	1	AE

DOOR PARTS

Δ	5	CDORFB011WRKZ	Door panel assembly complete	1	BT
Δ	5- 1	DDORFA575WRY0	Door panel	1	BE
	5- 2	GCOVHA330WRF0	Choke cover	1	AM
	5- 3	GWAKPA260WRF0	Door frame	1	AU
	5- 4	JHNDPA152WRF0	Handle	1	AQ
Δ	5- 5	LSTPPA134WRF0	Latch head (Right)	1	AL
Δ	5- 6	LSTPPA135WRF0	Latch head (Left)	1	AL
	5- 7	MSPRTA160WRE0	Spring	2	AB
	5- 8	PGLSPA629WREZ	Door glass	1	BC

MISCELLANEOUS

	6- 1	FAMI-A088WRM0	Low rack	1	AW
	6- 2	FAMI-A087WRM0	High rack	1	AW
	6- 3	TCAUHA214WRR0	K caution label	1	AC
	6- 4	FW-VZB351WRE0	Thermistor harness	1	AQ
	6- 5	FW-VZB882WREZ	Main wire harness	1	BE
*	6- 6	QW-QZA202WRE0	High voltage wire A	1	AK
	6- 7	TLABNA212WRR0	Menu label	1	AF
	6- 8	UAMI-A081WRF0	Defrost rack	1	AQ
	6-9	TINSEB069WRRZ	Operation manual	1	AM
	6-10	PCLICA029WRE0	Clip 347	1	AA
	6-11	TCADCA546WRR0	Cook book	1	AZ
	6-12	LHLDWA012WRE0	PURSE LOCK L	1	AB

SCREWS NUTS AND WASHERS

	7- 1	LX-EZA048WRE0	Special screw	2	AB
	7- 2	XFPSD60P14JS0	Screw; 6mm x 14mm	2	AA

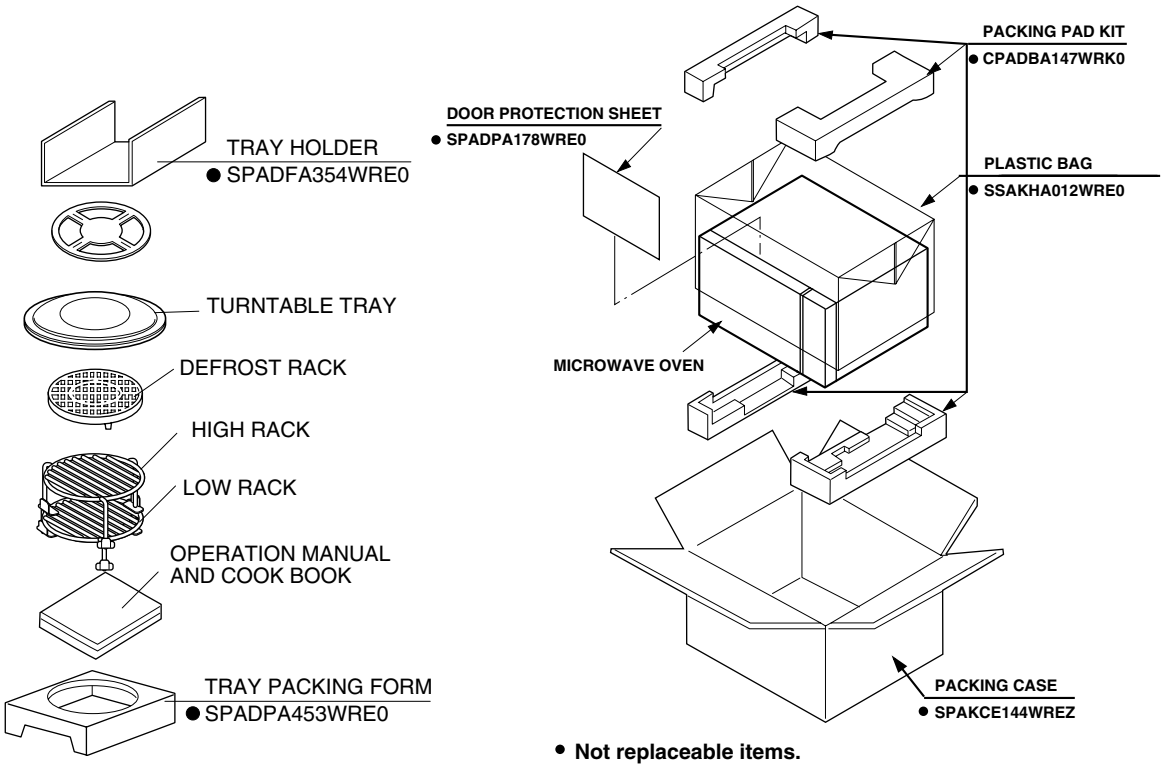
REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
7- 3	XCTWW40P08000	Screw; 4mm x 8mm	2	AA
7- 4	XCBWW30P06000	Screw; 3mm x 6mm	4	AA
7- 5	LX-CZ0052WRE0	Special screw	2	AA
7- 6	XBPSD40P06KS0	Screw; 4mm x 6mm	2	AA
7- 7	XOTSD40P12RV0	Screw; 4mm x 12mm	9	AA
7- 8	XJPSD40P10000	Screw; 4mm x 10mm	10	AA
7- 9	XBPSD30P14K00	Screw; 3mm x 14mm	1	AA
7-10	XBPSD40P25000	Screw; 4mm x 25mm	2	AA
7-11	XBPSD50P14JS0	Screw; 5mm x 14mm	6	AA
7-12	XFPSD40P25000	Screw; 4mm x 25mm	2	AA
7-13	XCTSD40P08000	Screw; 4mm x 8mm	3	AA
7-14	XFPSD40P06000	Screw; 4mm x 6mm	8	AA
7-15	XEPSD30P08XS0	Screw; 3mm x 8mm	2	AA
7-16	XCPSD40P08000	Screw; 4mm x 8mm	5	AA
7-17	XOTWW40P10000	Screw; 4mm x 10mm	13	AA
7-18	LX-WZA022WRE0	Washer	1	AB
7-19	XHPSD40P08K00	Screw; 4mm x 8mm	4	AC
7-20	XOTSD40P08000	Screw; 4mm x 8mm	4	AA
7-21	XHPSD30P08000	Screw; 3mm x 8mm	2	AA
7-22	XFPSD40P08000	Screw; 4mm x 8mm	3	AA
7-23	XHTSD40P08RV0	Screw; 4mm x 8mm	12	AA
7-24	XOTSD40P12000	Screw; 4mm x 12mm	13	AA
7-25	XBTWW40P06000	Screw; 4mm x 6mm	14	AA
7-26	XNESD40-32000	Nut; 4mm x 3.2mm	2	AA
7-27	XNEUW40-32000	Nut; 4mm x 3.2mm	1	AA
7-28	XWSUW40-10000	Washer; 4mm x 1 mm	1	AA
7-29	XWVSD60-07000	Washer; 6mm x 0.7 mm	1	AA
7-30	LX-CZA030WRE0	Special screw	2	AA
7-31	XOTSE40P12000	Screw; 4mm x 12mm	4	AA
7-32	XCPSD30P06000	Screw; 3mm x 6mm	7	AA
7-33	LX-CZA060WRE0	Special screw	1	AC

HOW TO ORDER REPLACEMENT PARTS

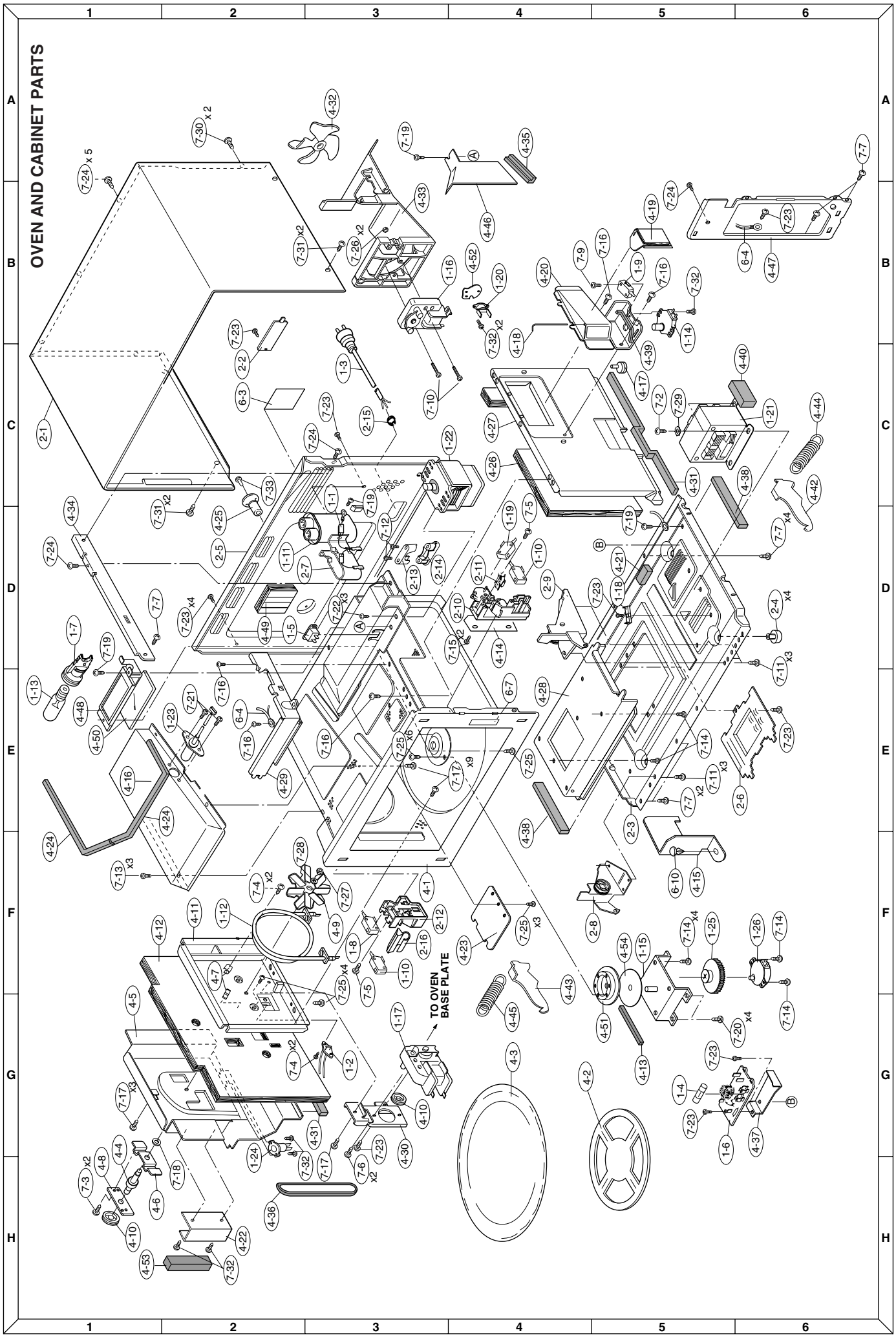
To have your order filled prompty and correctly, please furnish the following information.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

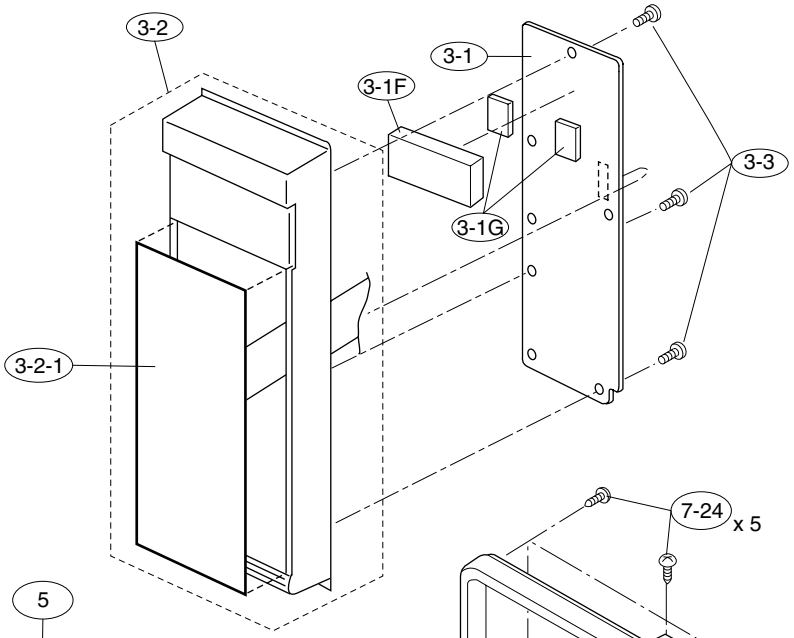
PACKING AND ACCESSORIES



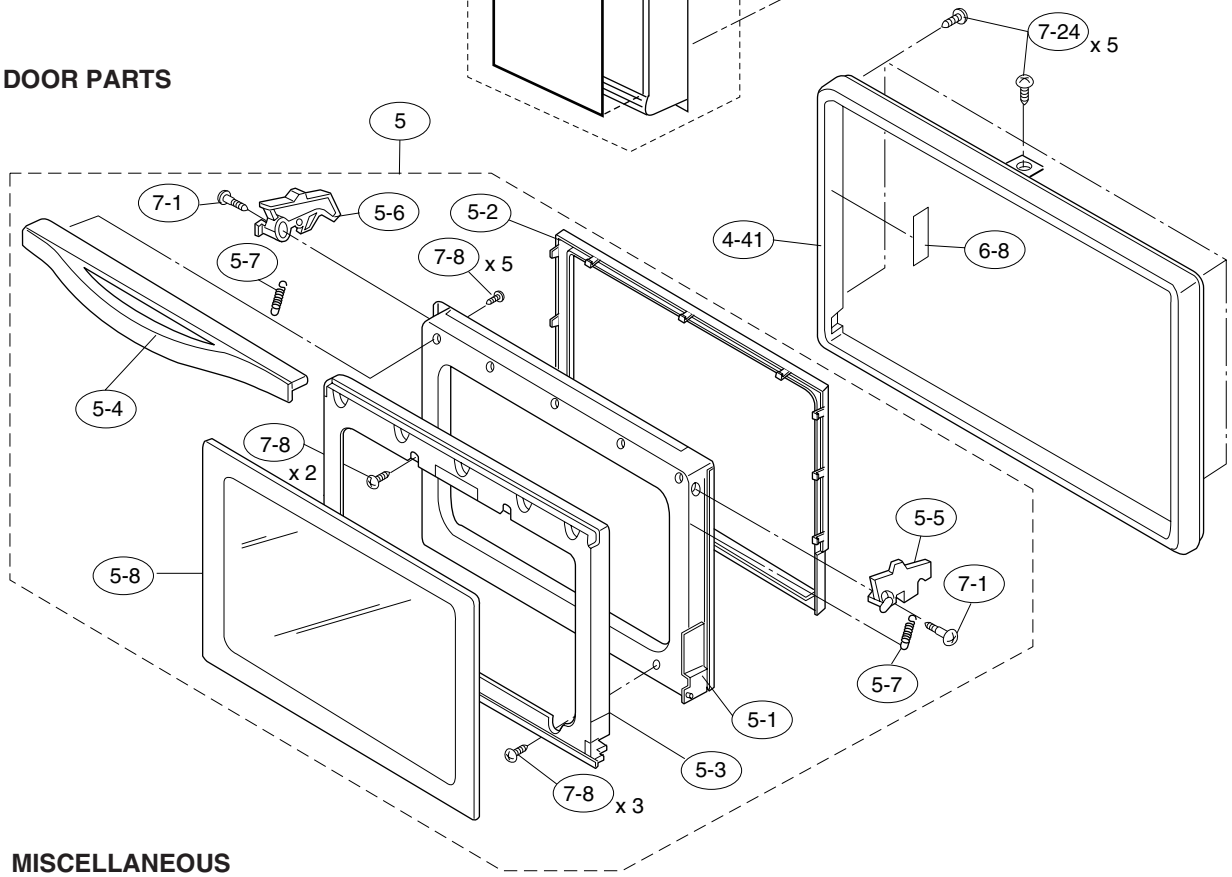
● **Not replaceable items.**


OVEN AND CABINET PARTS
TO OVEN BASE PLATE

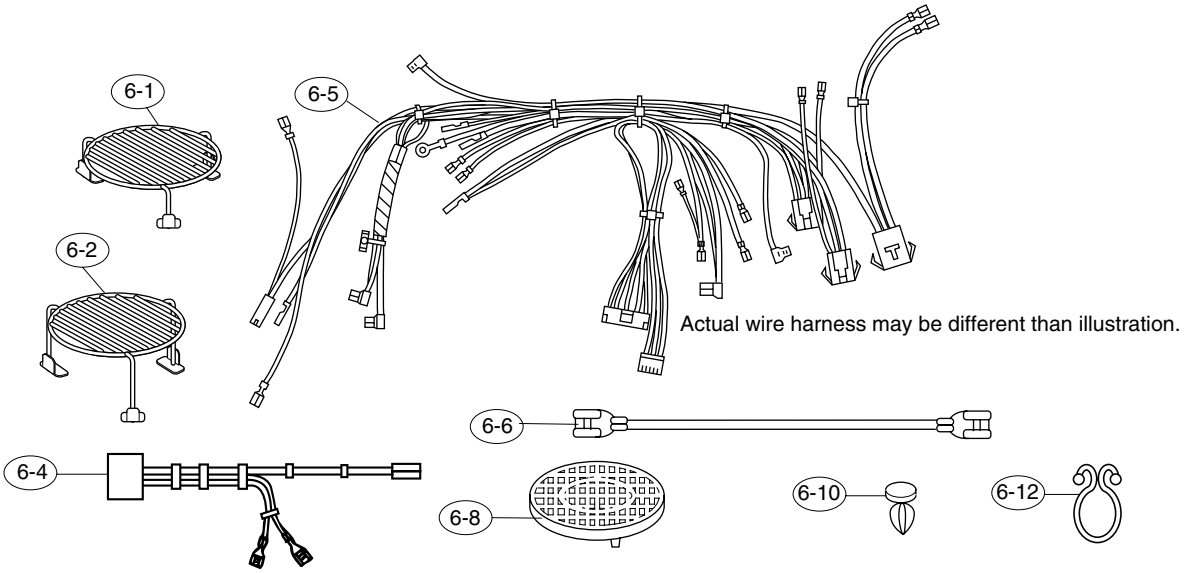
CONTROL PANEL PARTS



DOOR PARTS



MISCELLANEOUS



SHARP

'04SHARP CORP. (9S0.CD_E)